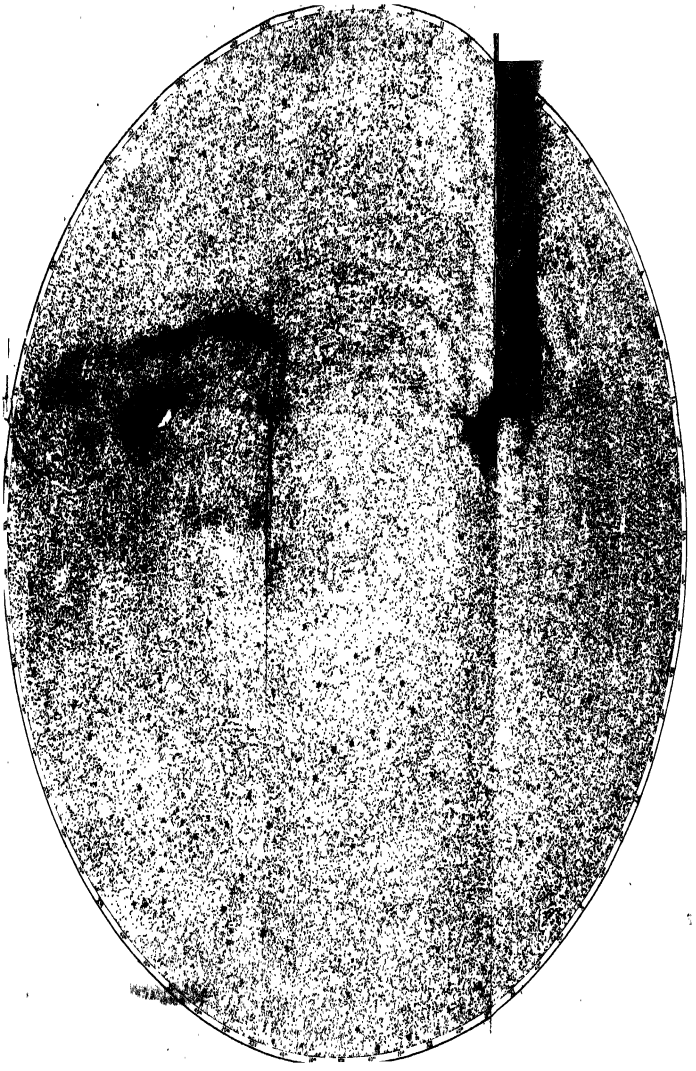


LEISURE READINGS

BY

EDWARD CLODD, ANDREW WILSON
THOMAS FOSTER, A C RANYARD, AND
RICHARD A PROCTOR

WITH ILLUSTRATIONS

Let knowledge grow from more to more

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PREFACE.

THE Essays in this Volume are selected for the most part from among the contributions to KNOWLEDGE (the weekly journal,—but also, I trust, to Knowledge itself) during the first ten months of its existence. Others by the same Authors, and Mr. Grant Allen, form "Nature Studies," the fourth volume of the "Knowledge Library Series." The object in all these Essays has been that which the projectors of KNOWLEDGE have had in view,—to bring scientific facts before the public in simple but correct words. Some of the Essays in the present volume are rather literary than scientific; yet it may be noticed that even in the Essay on Dickens' last and unfinished novel, the scientific method has been applied to the solution of a literary problem. Mr. Foster's Essay, "Nature Myths in Nursery Rhymes," though a jest, is not an idle one.

RICHARD A. PROCTOR.

LONDON, *December*, 1882.

CONTENTS.

THE STAR-LIT HEAVENS. BY R. A. PROCTOR ... ...*Page* 1

THE COMET SEEN DURING THE ECLIPSE. BY A. C. RANYARD (*illustrated*) 5

THE MENACING COMET. BY R. A. PROCTOR (*illustrated*) 10

HAS THE MOON AN ATMOSPHERE? BY A. C. RANYARD (*illustrated*) 22

ANTIQUITY OF MAN IN WESTERN EUROPE. BY E. CLODD 34

DR. J. W. DRAPER. BY R. A. PROCTOR (*with a Portrait*) 69

ILLUSIONS. BY THOMAS FOSTER (*illustrated*) 78

THE LATER STONE AGE IN EUROPE. BY E. CLODD ... 108

ENGLISH OR BRITISH? BY THOMAS FOSTER 130

BRITISH AND AMERICAN ENGLISH. BY R. A. PROCTOR... 169

NORMAN AND SAXON BLOOD ROYAL. BY THOMAS FOSTER 204

NATURE MYTHS IN NURSERY RHYMES. BY THOMAS FOSTER 231

THE ÆSTHETIC SCHOOL 265

BETTING AND MATHEMATICS. BY R. A. PROCTOR 271

FALLACIES. BY R. A. PROCTOR 278

WINNING WAGERS. BY R. A PROCTOR 290

"THE MYSTERY OF EDWIN DROOD." BY THOMAS FOSTER 297

with millions of suns, its richer portions blazing so resplendently that no eye could bear to gaze long upon the wondrous display. But with every increase of power more and more myriads of stars would break into view, until at last the scene would be unbearable in its splendour. The eye would seek for darkness as for rest. The mind would ask for a scene less oppressive in the magnificence of its inner meaning; for even as seen, wonderful though the display would be, the glorious scene would scarce express the millionth part of its real nature, as recognised by a mind conscious that each point of light was a sun like ours, each sun the centre of a scheme of worlds such as that globe on which we "live and move and have our being."

Who shall pretend to picture a scene so glorious? If the electric light could be applied to illumine fifty million lamps over the surface of a black-domed vault, and those lamps were here gathered in rich clustering groups, there strewn more sparsely, after the way in which the stars are spread over the vault of heaven, something like the grandeur of the scene which we have imagined would be realised,—but no human hands could ever produce such an exhibition of celestial imagery. As for maps, it is obviously impossible by any maps which could be drawn, no matter what their scale or plan, to present anything even approaching to a correct picture of the heavenly host. There is no way even of showing their numerical wealth in a single picture.

Take, for example, the chart of 324,198 stars which I drew eight years ago, of which a portion is roughly presented in the illustrative map. Here the points and discs representing stars congregate together so closely, in places, that there is no room for more to be shown, and those which are shown are but inadequately presented. Yet what does this chart show of the heavenly host, regarded merely in their numerical aspect? The stars here charted are only those which can be seen, or rather only those which have been seen, with a telescope $2\frac{4}{5}$ inches in aperture, such a telescope as can be seen in every optician's window. I say only those which *have* been seen, because I know from my own observations that Argelander and his assistant observers, had they cared to turn their telescopes to the heavens only on the darkest and clearest nights, could certainly have seen and charted half a million stars at least, instead of the 324,000 which they have actually included in their survey of the Northern heavens. In the Southern heavens at least as many could be seen. A million stars within the range of a telescope absolutely insignificant compared with the gauging telescopes of the Herschels, which again in light-gathering power were feeble compared with the mighty Parsonstown reflector!

Utterly hopeless would it be to attempt to delineate the stellar host within the range of these noble instruments, when already we see the method of charting fail us for the work of the puny tube which

Argelander employed. Yet how impressive is the scene roughly depicted in the chart forming our frontispiece! Each one of the points there shown represents a sun, and tells us, therefore, of a solar system,—of a system in which such a globe as this earth would be but as a point, and regions exceeding in extent the mightiest kingdoms over which the monarchs of earth have ruled would be utterly as nothing.

When we pass onward from these glories to the vaster glories revealed by more powerful telescopes, we seem to lose ourselves in the contemplation of the mysteries of infinite space, infinite power, infinite wisdom. Yet it is not till we have learned to look on all that the telescope reveals as in its turn *nothing* compared with the real universe, that we have rightly learned the lessons which the heavens teach, so far, at least, as it lies within our feeble powers to study the awful teaching of the stars. The range of the puny instruments man can fashion is no measure, we may be well assured, of the universe as it is. The domain of telescopically visible space, compared with which the whole range of the visible universe of stars seems but a point, can be in turn but as a point compared with those infinite realms of star-strewn space which lie on every side of our universe, beyond the range,—millions of times farther than the extremest scope,—of the instruments by which man has extended the powers of vision given to him by the Almighty. The finite—for after all, infinite though it seems to us,

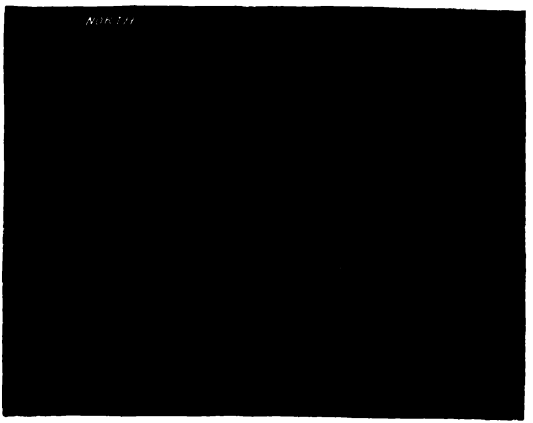
the region of space through which we can extend our survey is but finite—can never bear any proportion to the infinite save that of infinite disproportion. All that we can see is as nothing compared with that which is; all we can know is as nothing; though our knowledge "grow from more to more," seemingly without limit. In fine, we may say (as our gradually widening vision shows us the nothingness of what we have seen, of what we see, of what we can ever see), not, as Laplace said, *The Known is Little*, but THE KNOWN IS NOTHING; not *The Unknown is Immense*, but THE UNKNOWN IS INFINITE.

THE COMET SEEN DURING THE ECLIPSE.

BY A. C. RANYARD.

THE accompanying sketch gives the position of the comet, as shown on my photographs, with some of the more marked rays of the corona stretching out from the sun's limb on the side towards the comet; but no attempt is made to indicate the smaller structure of the corona. The scale of the woodcut nearly corresponds with the largest of the photographs. It will be seen that the head of the comet is situated at about a solar diameter from the sun's limb, and that the tail is greatly inclined to the line joining the head of the comet with the sun's centre. There is a slight curvature

of the comet's tail; but its general direction is such that if a medial line, which we will call the axis of the tail, were produced, it would not pass through the moon's disc. It is evident that this inclination of the tail cannot be merely due to an effect of perspective, the tail of the comet being really radial, and the nucleus situated on this side of the sun's centre,



or on the opposite side of the corona—for a straight line can only be projected into a straight line or a point; and if the sun's centre lay upon the axis of the comet's tail produced, the tail, from whatever position it was viewed, would always appear as radial to the sun's limb. A little consideration will show that the inclination of the tail to the line drawn from the sun's centre to the head of the comet may have been greater

than it appears in the photograph, but it cannot have been less.

Though the fact that the tail of the comet was greatly inclined to the radius vector struck me on first examining the photographs, the probable significance of the fact has only recently occurred to me. Small jets issuing in various directions from the nuclei of large comets have frequently been observed, but these jets do not extend to any great distance from the nucleus; and, as far as I am aware, they have not been observed extending beyond the outer envelopes of the head of the comet; while the chief tail, into which the envelopes of the head merge, streams away in a direction opposite to the sun. If the comet were moving freely in space (that is, not in a resisting medium), and a repulsive force from the sun was the only force acting upon the matter of the tail, we should expect to find the tail either straight, or curved in the plane of the orbit of the comet; when the velocity with which the matter of the tail is driven away is very great, compared with the orbital velocity of the nucleus, we should expect to find a straight, or very nearly straight, tail stretching away from the sun: but if the velocity of the matter of the tail is not very great, as compared with the orbital velocity of the nucleus, we should expect to find a curved tail, with the part in the immediate neighbourhood of the nucleus directed away from the sun, for the matter of the tail on leaving the head of the comet would have an orbital velocity which would carry it onward

equally with the nucleus, if undisturbed by a resisting medium, and the small particles of the tail would only drop behind as the motion of the nucleus and particles of the tail were changed by the central forces acting upon them. But, if the comet were moving in a resisting medium, the small particles of the tail would lose their orbital velocity more rapidly than the matter of the nucleus, and the tail would have the appearance of being blown backwards by a wind.

Having regard to the direction of the curvature of the tail, which is slightly concave towards the south, and to the inclination of the general axis of the tail to a radial line drawn from the sun's centre to the nucleus of the comet, we may, I think, assume that the comet was moving in an upward direction, but whether towards us or away from us, and whether it was nearer or more distant from us than the sun's centre, or whether it was coming up to or had passed perihelion, must, I fear, remain a mystery.

The comet observed by Sir I. Newton in 1680, and the comet of last year, which was referred to by Mr. Proctor as having not improbably had its period shortened by the resistance of the corona, both, probably, passed within a third of a radius of the sun's surface. From general reasoning one would suppose that under the influence of solar gravity the density of the gaseous atmosphere of the corona would increase rapidly as we descend from the outer limits of the corona towards the photosphere, but our want of knowledge with respect to the temperature of the

coronal area, and the behaviour of dust particles and gaseous matter at such high temperatures, prevents our making any useful assumption with respect to the law of increase of density of the solar atmosphere. It is known that in the chromosphere at the base of the corona, hydrogen, and many of the terrestrial elements, give a spectrum of narrow lines similar to the spectrum given in terrestrial laboratories under very small pressures; but, whatever the density of the gaseous matter of the chromosphere may be, there are facts which render it probable that there is a resisting medium within the coronal area which increases in density as we descend from the outer limits of the corona towards the photosphere. For example, the structures in the lower parts of the corona are more curved than the rays which extend into the outer parts of the corona, as if they had been acted upon and bent by currents in a denser atmosphere, and the forms of some of the irruption prominences also indicate the existence of a resisting medium which decreases in density in its higher regions. Definite evidence with respect to the existence of a resisting atmosphere has been deduced from observations made by Professor Young with respect to the rate of projection of irruption prominences. See a paper by Mr. Proctor, published in the *Monthly Notices* of the Royal Astronomical Society for December, 1871.

The comet observed during this eclipse is not the only cometary body which has been observed in the neighbourhood of the corona during an eclipse. The

In its opening paragraph, I state that views advanced respecting the comet by others, "not by fanciful theorisers, but by mathematicians of eminence, suggest the possibility, nay, even some degree of probability, that this comet may bring danger to the solar system." And I go on to say that it is that possibility which "I have to discuss." The possibility, even some degree of probability, that a comet may bring danger—this possibility suggested by the views of others, and to be discussed by me—does not, I apprehend, amount to a definite statement on my part that there is "really a very considerable chance of a catastrophe fifteen years hence, which may put an end to our earth altogether." Let us, however, examine the article further.

I go on to show that the path of the comet of 1880 carried it singularly near to the sun. This, of course, is simply a scientific fact. I next explain that the observed part of the track of the comet of 1880 coincided, or nearly so, with that of the comet of 1843; but that, whereas the most trustworthy calculations of the orbit of the comet of 1843 assigned a period of about 175 years, the observed period of its last circuit—if that object and the comet of 1880 are really identical—was only 37 years. This part of the inquiry is more theoretical than the former. Still, the evidence is such as to make it highly probable that the comet of 1880 really is one and the same as the comet of 1843, and that there really has been a diminution of the period of revolu-

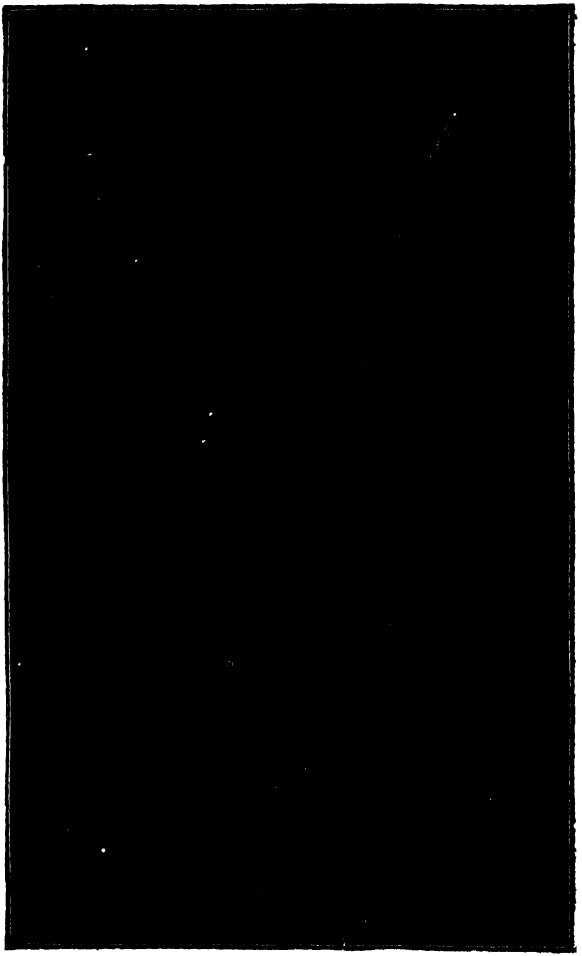


Fig. 1.—The Menacing Comet.

tion from more than a hundred to less than forty years.

It is towards the close of this part of the inquiry that the anticipation of the comet's return in 1897 is referred to. As presented by the *Spectator* and the Bishop of Manchester, this might be supposed to be such a prediction as, for instance, I made in 1868 of the epochs of the beginnings and endings of the transits of Venus in 1874 and 1812 for different parts of the earth's surface. As a matter of fact, the prediction is not mine, but Herr Marth's (quoted, and, as a quotation, given in smaller type than the rest); it is not advanced definitely, but in the following terms:—"I should not be at all surprised," says Herr Marth, "if it should turn out that this comet of 1880 is the same as the comet of 1843 and that of 1668, and that its revolution has been so much affected that possibly it may return in, say, seventeen years." (This was written in 1880.)

I go on to show that, if this is so, the comet must before long be absorbed by the sun—still not naming 1897 or any other year, but speaking with due scientific caution—"after only a few circuits—possibly one or two."

I then note the only way in which the absorption of a comet might do harm—that is, not as Newton thought, by adding fuel to the solar fires, but by the conversion of the momentum of the meteoric masses, forming or following the head, into heat. I mention, in passing, my own belief that the sudden increase of

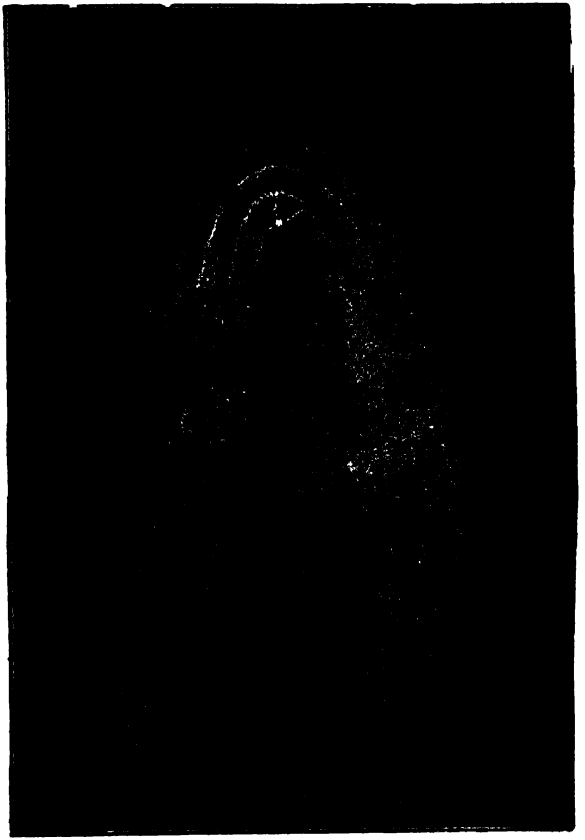


Fig. 2.—Another comet which might have been dangerous if it had gone the wrong way.

splendour observed in the star T Coronæ (not τ, as has been mistakenly asserted) was due to the fall of a large comet, followed by a train of closely-aggregated meteors upon that distant sun. This I fully believe to be the most probable, if not the only available, interpretation of that and similar phenomena. "Without saying,"—I proceed, and this seems to me the only passage in my essay which could have suggested any anxiety about the earth's future,—"without saying that I consider there is absolute danger of a similar outburst in the case of our own sun, when the comet of 1843 shall be absorbed by him (a result which will, in my opinion, most certainly take place), I will go so far as to express my belief that, if ever the day is to come when 'the heavens shall dissolve with fervent heat,' the cause of the catastrophe will be the downfall of some great comet on the sun." What I here consider as certain may, perhaps, have been misunderstood as the coming of such a catastrophic end; but it should be manifest that I only regard the absorption of the comet of 1843 as most certain—regarding the time as quite uncertain, and the effects as extremely problematical. I have, indeed, shown elsewhere (see "Suns in Flames," in my "Myths and Marvels of Astronomy") that there is every reason for believing that all comets of the destructive sort have long since been eliminated from the solar system. So that, as in the essay referred to by the *Spectator*, I refer back to an essay in my "Pleasant Ways in Science," in which essay I

refer back to the other in "Myths and Marvels," without in either case indicating any change of view, I might fairly claim to have very definite views as to the perfect safety of the solar system, even if I had not recently pointed out, with special reference to the comet of 1843, our probable complete immunity from danger. In the *Cornhill Magazine* for December, 1881, there is a paper, bearing my initials, on "Dangers from Comets," in which it is shown—as sundry newspaper articles have been good enough to explain in turn to myself—that if there were any real danger, save for the comet itself, we should have known it by great increase in the solar emission of heat in 1843, when the comet was checked so importantly in its career, and again in 1880, when it was subjected to another equally severe interruption of its onward course.

The article finally points out the kind of danger which in all probability would ensue if a comet of the larger sort fell into the sun. If there is anything remarkable in this part of my essay, which seems to have been regarded as the most sensational, it is its extremely cautious wording. I may go so far as to poke a little fun at myself by saying that it is almost absurdly cautious. I point out, that if there are planets circling around the sun which blazed out in Corona in May, 1866, to eight hundred times its former lustre, and if there were living creatures on them at all resembling ourselves, those creatures must most certainly have been destroyed. It takes no wizard to know this. I

then go on to say that "if at any time a great comet falling directly upon the sun" (which the comet of 1843 and 1880 most certainly will *never* do) "should, by the swift rush of its meteoric components, excite the frame of the sun to a lustre far exceeding that with which he at present shines, the sudden access of lustre and of heat would prove destructive to every living creature, or, at any rate, to all the higher forms of life, upon this earth." And, though I knew when I wrote this that I was making no rash prediction, I protest I never noticed, until the rash predictions assigned to me by the *Spectator* and the Bishop of Manchester set me reading over my own essay, that this amounted only to an announcement of the following highly-impressive nature:—If such a comet as we have no reason to suppose actually existent (nay, every reason to consider certainly non-existent in the sun's case) should produce a degree of solar heat (which such a comet may, or may not, be capable of producing), exceeding hundreds of times the sun's present heat, and if that heat lasted but a few days, the earth's inhabitants must all perish. This very cautious announcement does not mean, I venture to point out, that fifteen years hence the comet of 1843 falling into the sun will so raise his heat that all of us will be destroyed.

I may remark that the newspaper announcement has elicited various expressions of opinion, showing the great ignorance which prevails even in these days of cheap scientific literature respecting scientific

matters. Thus it has been carefully explained by some that comets are entirely vaporous, evidently in ignorance of what has been learned respecting the meteoric nature of comets; by other writers, that Lexell's comet was absorbed by Jupiter or by his

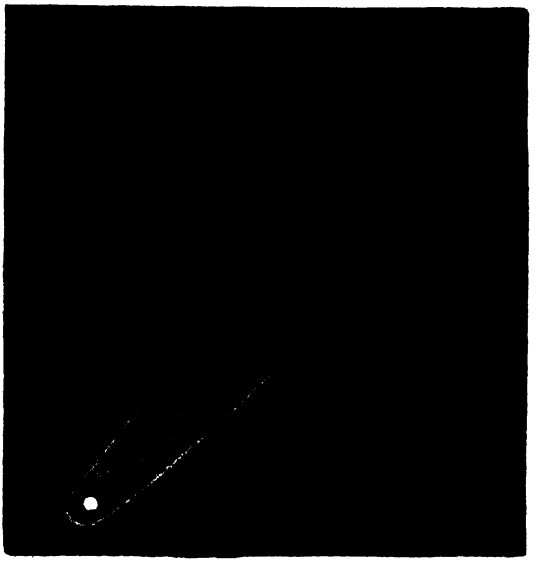


Fig. 3.—A comet which might injure a solar system, though not ours.

satellites (which Leverrier entirely disproved); while another writer (in the *Christian World*, and followed by the *Globe*) propounds the amazing statement that the sun's heat does not travel so quickly as his light,

so that, even though we saw a great outburst, due to the destruction of a comet, some ninety or a hundred years would have to pass before the earth would receive the heat then generated! It would be interesting to ascertain whence this singular idea was obtained—by what strange misapprehensions of some statement in a scientific work. Of course, there is not the slightest foundation for it. The sun's heat comes to us with his light, not only travelling at the same rate, but being a part of the very same undulatory disturbance, and a considerable portion being derived from the very same waves. Some of the waves, indeed, which affect us as light affect us very little as heat, and some of the waves which affect us as heat produce no effect which the eye can appreciate as light. But the orange and red light waves are very active as heat-waves too, and there is not the slightest reason for supposing that the so-called dark heat-waves, which, with these, make up the total supply of solar heat, would lag many seconds behind them on the journey earthwards.

However, there is not the slightest reason to fear that the comet of 1843 and 1880 (assuming they are the same) will do any harm to the solar system when finally absorbed. It would be quite otherwise, I believe, if such a comet as that of the year 1811, Fig. 3, were to fall directly upon the sun. This, the most remarkable (in reality, though not in appearance) of all known comets, was fortunately some 100 million miles from the sun at the time of its nearest

approach to him, and can never bring the slightest trouble to the solar system. But, if its course had chanced to be directed full upon the sun, the meteoric masses doubtless forming its head and train (not tail), falling in countless millions upon him at the rate of more than 300 miles per second, when they crossed his visible surface, and probably passing deep below that surface with ever and most rapidly-increasing velocity to reach his real nucleus, would have generated an intensity of heat far exceeding that which he constantly emits. The increased emission might not have lasted a month, or even a week, but it would have sufficed.

So, again, what we now know of cometic structure leads us to believe that the comet of 1858, called Donati's, whose head is shown in Fig. 2, would have proved a very dangerous visitor had its course led it directly towards the nucleus of the sun. Fortunately, the chance of any comet visiting our system from interstellar space, travelling directly towards the sun, is so small, that it may be reckoned "almost at naked nothing." As to comets already belonging to our system, if any such have orbits passing very close to the sun, so as to be checked in their career at every perihelion passage, it is clear (from the continuance of life during many hundreds of thousands of past years on the earth) that the mischief must long since have been taken out of them—unless we suppose (which is incredible) that the last perihelion passage of such a comet preceded the beginning of life on the earth.

HAS THE MOON AN ATMOSPHERE?

BY MR. RANYARD.

No lunar clouds are ever seen floating over the sharply-defined objects of the lunar landscape. As the sun rises upon the moon, the transition from darkness to light is quite sudden, no zone of twilight stretching beyond the sun-illuminated region can be detected, and as the moon passes over bright stars, there is no gradual diminution of their light as they approach the lunar limb, but they disappear suddenly, as if snuffed out, at the instant that the lunar limb covers them. It is quite certain, therefore, that the moon has not a vapour-laden atmosphere which is as dense, or nearly as dense, as the atmosphere which envelopes the earth. There is no evidence tending to show that rays of light are bent as they graze the lunar limb. Rays grazing the earth's surface in a similar manner would be turned through an angle of more than a degree from their original course by refraction in the earth's atmosphere, for it is known that stars, when seen upon the horizon, are raised more than half a degree above their true places by the bending which rays of light undergo before they reach the observer. If there were any such refraction of light by a lunar atmosphere, the sun would never be entirely hidden by the dark body of the moon

during an eclipse. During the recent total eclipse, as seen from Sohag, the moon's diameter was about half a minute of arc greater than the sun's diameter, and at the time of central eclipse, when the centre of the moon's disc coincided with the centre of the sun's disc, the sun's limb would have remained visible if there had been a lunar atmosphere giving a refraction equal to 1-240th part of the refraction which would have been caused by the earth's atmosphere. But not only was the sun's limb hidden at the time of central eclipse, but it remained hidden for more than a minute—in fact, the observed duration of totality agreed within a few seconds with the duration calculated on the supposition that there is no bending of light by a lunar atmosphere.

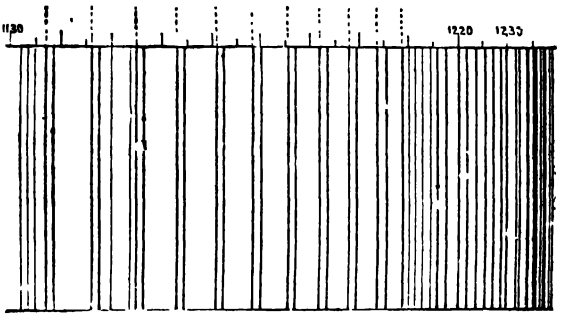
There is always some discordance amongst observers as to the actual duration of totality, for the disappearance of the sun's light is not an absolutely instantaneous phenomenon, so that occasionally trained observers standing beside one another differ as much as three or four seconds in their estimates of the time of the commencement of the total phase. There is also some uncertainty as to the real diameters of the sun and moon. But, after making allowance for these uncertainties, we may safely assert that the observed duration of total eclipses agrees with the calculated duration sufficiently closely to enable us to be sure that there is not an atmosphere about the moon capable of causing a refraction equal to one two-thousandth part of the refraction which would be

caused by the earth's atmosphere under similar circumstances.

But this does not prove that there is no lunar atmosphere, or even that there is not a lunar atmosphere equal to one five-hundredth part of the terrestrial atmosphere, for the mass of the moon is less than one-eightieth part of the earth's mass, so that the weight of a body at the moon's surface is less than one-sixth of the weight it would have upon the earth's surface. And an atmosphere like our own would, if removed to the moon (the temperature remaining the same), be more loosely packed, and would extend to a much greater height above the surface.

There is another method by which the existence of a lunar atmosphere may possibly be detected. Besides bending rays of light, the earth's atmosphere absorbs certain wave lengths more than others, so that in the tpectrum of sunlight which has passed through the lower strata of the atmosphere for some distance, as at sunrise or sunset, there are certain lines which are not to be found in the spectrum of a high sun. M. Thollon, who was one of the observers of the total eclipse at Sohag, has spent many years in making a great map of the solar spectrum, in which he has laid down the position and relative intensities of the solar lines, and he has also mapped down the places of many hundreds of atmospheric lines which are proved not to belong to the true solar spectrum, because they grow more intense as the sun sinks towards the horizon, and vary with the amount of aqueous vapour present in the atmosphere.

The instrument with which M. Thollon has made his observations is a bisulphide of carbon spectroscope, giving a dispersion equivalent to thirty-one prisms of 60° of ordinarily dense flint glass, and giving a much brighter spectrum and far better definition than could be obtained with such a cumbersome train of prisms, if it were possible to mount them and keep them in adjustment. M. Thollon has in a very simple manner contrived to make the solar rays pass three times through a system



The B group as seen in M. Thollon's Instrument.

of prisms and half-prisms, so that the eye-piece of the viewing telescope and the slit remain fixed, while, by a motion of the prisms, different parts of the spectrum can be brought into view. M. Thollon has made with this instrument a map of the solar spectrum 49 feet long, showing more than 4,000 lines.

The wood-cut, copied from one of M. Thollon's drawings, represents the well-known B group, which lies towards the red end of the spectrum. It is a

group which is modified in a most striking manner by atmospheric absorption.

During the total solar eclipse of July, 1878, Professor C. A. Young examined this region of the solar spectrum with the slit of his spectroscope placed upon the image of the solar crescent, so that light from the sun's disc entered one half of the slit while the other half of the slit was upon the image of the dark moon. On looking into the eye-piece of his spectroscope a brilliant solar spectrum was seen in the half of the field corresponding to the half of the slit which was upon the sun's disc, while the other half of the field appeared quite black. The division between the two halves of the field was exceedingly sharp. There was no gradual dimming of the solar spectrum close to the moon's limb, and Professor Young was not able to recognise any of the well-marked terrestrial absorption lines, or any new lines in the solar spectrum, though he spent some time in carefully examining the region close to the moon's limb.

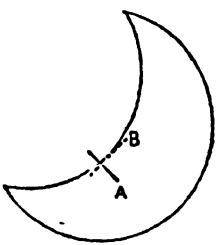
Professor Young's observation was made with a grating spectroscope of 17,300 lines to the inch, which in the spectrum observed gave a dispersion about equal to the dispersion of M. Thollon's liquid spectroscope; but the amount of light and the sharp definition obtainable with Professor Young's instrument was not equal to that given by M. Thollon's instrument.

It will be seen that the light which enters the slit

close to the moon's limb must, if there be a lunar atmosphere, have passed through the densest portions of it; but although the air of Colorado, where the observation was made, was very dry, and the sun was at a considerable altitude (more than 41° above the horizon), so that there would be very little absorption taking place in the earth's atmosphere, and the lunar absorption lines, if any, ought by contrast to have been well shown, Professor Young was unable to detect any trace of absorption. I was observing near to him, and he kindly gave me an opportunity of looking through his instrument. I was much struck by the sudden transition from the ordinary solar spectrum to utter darkness, a transition totally unlike that which is observed when the slit lies across the nucleus of a sun spot. The edge of the spectrum was much more strikingly abrupt and sharply defined than the edge of the spectrum which corresponds to the sun's limb when the slit is placed radially on the uneclipsed sun so as to project beyond the solar disc, and the dark lines of the solar spectrum were sharply cut off, apparently without alteration. No evidence, therefore, was obtained by Professor Young tending to show that any absorption of recognisable amount takes place at the lunar limb.

We will next examine the evidence which was obtained by MM. Thollon and Trépied during the recent total eclipse which they observed in the dry air of Upper Egypt. Though Professor Young had failed to find any trace of absorption, they determined

to repeat the observation with spectroscopes giving slightly greater dispersion and much better definition than the form of spectroscope used by Professor Young. There were at Sohag two large bisulphide of carbon spectroscopes, one belonging to M. Trépied, the Director of the Observatory at Algiers, which had been made upon the model of M. Thollon's spectroscope, and the other M. Thollon's own instrument. The form of these spectroscopes does not permit the observer easily to turn the slit round. It was agreed, therefore, that they should be mounted so that the



slit of one of them would be radial, while the other was tangential at the part of the moon's limb where the last portion of the solar light would be visible. M. Trépied's slit was placed radially in the position marked by the thick line A in the figure, while M. Thollon's slit was placed tangentially in the position indicated by the dotted line B. Their instruments were erected within a few feet of one another, in a building constructed of reeds and wood, some ten yards to the south of my tent observatory. It was

arranged that during the partial phases of the eclipse I should visit their enclosure and observe with their instruments the spectrum close to the lunar limb. I cannot do better than give a translation of M. Thollon's account of his observation. It is taken from his report, which was presented to the French Academy, and is published in the *Comptes Rendus* for the 19th of June, 1882, page 1,633. He says:—

"My great apparatus performed marvellously, and had never given me more beautiful images. I passed in review with scrupulous attention all the telluric region of the spectrum, commencing at the red end. Between A and B I could not perceive any notable change. Arrived at B, I was quite suprised to see a decided reinforcement of the rays which compose this group. I hesitated to communicate this observation to M. Trépied, for fear of disturbing him, when he announced to me that he saw this reinforcement of the group B in a striking manner. It was of the highest importance to verify this fact; so, after some seconds of repose, I applied to it all the force of my attention. All the contour of the moon which was projected upon the sun was successively brought upon the slit, and, strange and inexplicable as it is to me, I did not succeed in re-observing the reinforcement as it had appeared to me in the first instance, nor even to see it in a manner I could be quite sure about. Mr. Ranyard and M. Puiseux, on being referred to, saw the phenomenon with the same certainty as M. Trépied in his apparatus, and with the same uncertainty as

myself in mine. This difference was caused perhaps by the difference of the orientations. The slit of the spectroscope of M. Trépied, being parallel to the line of centres, cut the limb of the moon perpendicularly, while my slit met the limb tangentially, or in a very oblique manner."

M. Trépied, in his report of observations of the eclipse published in the *Comptes Rendus*, p. 1,639, says :—"I commenced in the red region ; arrived at the B group, I observed a reinforcement of the dark lines close to the lunar limb. The group B, as one can see it in this instrument, is made up of a group of sixteen sharp lines, and then, on the side towards A, of a series of double lines very regularly spaced. In this second part of the group it is always the least refrangible of the two rays which is the darkest; and it was the least refrangible ray of the pairs which was the most affected at the moon's limb. I tried to estimate to what distance from the limb of the moon the reinforcement extended. The part of each line which was darkened appeared to me to correspond to about 1-40th of the height of the spectrum. Since the length of the slit is 7 millimètres, and corresponds to an eighth part of the diameter of the solar image, it is easy to conclude that the absorbing layer, if it exists, which is capable of producing the observed reinforcement, does not extend to a height above 5″ above the moon's limb. The phenomenon was much less visible in the apparatus of M. Thollon, as Mr. Ranyard and M. André Puiseux bore witness. On

the hypothesis that there is an absorbing layer about the moon, this difference of effect may be easily explained by the difference of the orientations; it will even be a necessary consequence. I ought to add, that even in my apparatus the increase of intensity of the lines was incomparably more feeble during the last phases of the eclipse—very doubtful for Mr. Ranyard, and nothing for MM. Thollon and André Puiseux."

I have given these observations at length, so that readers may judge of the comparative certainty with which the observers principally concerned speak of the evidence they obtained as to the existence of absorption in the lunar atmosphere. My own examination of the spectrum before totality was very short, and, in order to speak with certainty, I should have been glad of an opportunity of further examining the adjustments of M. Trépied's instrument. I can only speak with certainty as to the non-existence of absorption after totality when I examined the spectrum at greater leisure. Before totality, I did not notice the difference in the thickness of the double lines of the B group, though M. Trépied called my attention to the matter while I was looking through his instrument, and said that he had noticed such a difference. All the lines seemed to me to be slightly intensified near to the edge of the spectrum, where they were sharply cut off by the moon's limb.

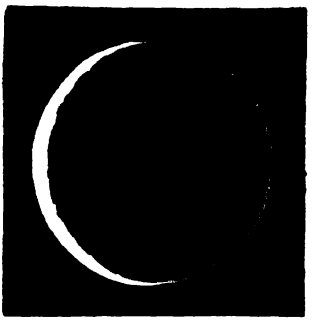
I did not at the time make an estimate of the distance from the edge of the spectrum to which the

slight thickening of the lines, I thought I could detect extended, but the phenomena I observed (which may have been a mere physiological effect of contrast, or may have been due to a want of accurate focussing of the image of the solar crescent on the slit), extended to a distance of certainly more than 1-40th of the breadth of the spectrum. The next day, on talking the matter over, I thought that it must have extended to at least 1-10th of the breadth of the spectrum. A height of 5″ to which the darkening of the lines observed by M. Trépied extended would correspond to a height of nearly six miles above the moon's limb. In the terrestrial atmosphere absorption increases very rapidly as we approach the earth, and, making all allowance for the difference between terrestrial and lunar gravity, it seems difficult to believe that phenomena of absorption could be traced to a height of twenty-four miles above the lunar limb.

It is quite possible that there might be a difference in the condition of the lunar atmosphere at the two limbs, for the limb of the moon which was examined before totality had just been exposed to the intense heat of the sun for a fortnight, while the limb which was seen upon the sun's disc after totality had been cooling during the long lunar night, and it is possible that absorbing vapours might arise under the solar heat which would again be deposited during the lunar night. Fortunately, it will not be necessary to wait for another total eclipse to repeat the observation. A partial solar eclipse is all that is required, and large

spectroscopes in all parts of the world from which such an eclipse is visible may be simultaneously directed to the lunar limb.

In connexion with this observation, I should like to direct the attention of naked-eye observers to the line of faint illumination which, at the time of new moon, is visible along the outer edge of the dark moon; that is, along the limb which has recently been exposed to the solar rays. Is this line of faint



illumination due to dispersion of the sun's rays within an atmosphere which has been raised by the sun's heat? I think that it is pretty certain that the phenomenon is not due to an effect of contrast between the *lumière cendrée* on the body of the dark moon and the background of sky; for I have held a circular diaphragm at a distance from the eye, so as just to exclude the light of the sky, and the band of faint illumination along the moon's limb was still visible;

and my old friend, Mr. Webb, of Hardwick, has kindly repeated this observation for me, and confirms me as to the objective character of the phenomenon. It is difficult to see why, if the light is due to earth-shine, the limb of the moon should be the brightest part. Such a band might possibly be caused by a phosphorescent light from the lunar surface, which slowly dies away as the lunar night advances. But, if this were the case, there should not be a similar band of brightness seen along the dark limb of the morning moon, which has been in darkness for half a lunation. I should be glad to learn whether other observers see the band extending with equal brightness along the whole limb, or does it seem to them to be decidedly brighter in the region of the lunar equator? And do they see a similar band of brightness along the limb of the morning moon?

THE ANTIQUITY OF MAN IN WESTERN EUROPE.

The sciences of anthropology and of the mutability of species, which latter finds its "analogy of faith" in the theory of evolution, attained their majority only two years ago. Although anthropology is a term of ancient date—for Aristotle used it, perhaps coined it—it was, until our own time, of restricted and un-

settled meaning, being applied to man only in limited directions, and even to treatises on New Testament criticism and fictile art! The title "Ethnological," selected by the earlier societies which had for their object the study of man, indicates the narrow programme by which their founders defined that object; but, as dealing with varieties of races and their habitats, it is now applied only to one branch of the comprehensive science which, under the general term "Anthropology," likewise embraces anatomy, psychology, philology, and history. With this last is nearly connected the branch which, under the name Prehistoric Archæology, covers the vast space lying behind written and traditional evidence, gathering therefrom the long-neglected witnesses of man's ways and works preserved in ancient river-valleys, caverns, mounds, and tombs, until it touches the last traces of his presence.

At first sight it may appear strange that, until within the last quarter of a century, man has excepted himself, save in the most empirical fashion, from that investigation which he has for a long period extended to the earth beneath him, and for a still longer period to phenomena above him. Such tardy inquiry into the history of his kind and its place in the succession of life upon the globe is mainly referable to his subjection to preconceived opinions based, so far as Christendom is concerned, upon the authority accorded to assumed explanations of these matters in the earlier chapters of Genesis. These, being re-

garded as an integral part of a divine revelation, were logically held to render superfluous, indeed impious, any inquiry; and thus the remarkable history of the only being on this planet competent to prosecute research into it, has been viewed through the refracting medium of a mythopœic past.

It was well for the advancement of science in bygone days that astronomy was earliest cultivated, for, although its brilliant discoveries were made in ages jealous of any progress in secular knowledge, the remoteness of the field which it explored made agreement, or tacit acquiescence, more possible. In our own time the friction of geology with traditional beliefs was softened by the flexile interpretation which orthodox critics, with that ingenuity which is "the badge of all their tribe," gave to the Biblical record. But no such harmony could be secured with Palæontology, which, with its proofs of the long reign of death before man appeared, confutes the "Mosaic" statement that agony and death came into the world as the fruit of his transgression in Eden; or between Prehistoric Archæology, with its countless relics demonstrating his primitive savagery and slow emergence therefrom, and the legend of his luxurious surroundings in the birth-land of the first pair. What bearing the acceptance of the only inferences deducible from such evidence has upon the elaborate "schemes of salvation," whose bases lie deep down in the doctrine of the fall, is beyond my present purpose to suggest.

It is from the researches of archæologists that the impetus has come. More than fifty years ago the famous cavern near Torquay, known as Kent's Hole, was explored, but the significance of its relics was not apparent for some years, during which they remained among curious, but unheeded, antiquities in museums. Fifteen years later, in 1840, M. Boucher des Perthes found "worked" flints mingled with the bones of rhinoceroses, cave bears, mammoths, &c., in gravel-pits near his house at Abbeville, in Picardy; but he failed to make converts among official *savants* to his conclusions that these chipped stones were tools and weapons of human workmanship, pointing to the high antiquity and primitive savagery of man in Western Europe. The non-existence of fossil man remained a "canon of palæontology" until the year 1859, when its heterodoxy was established by the acceptance of M. des Perthes's conclusions, to the confirmation and spread of which his converts contributed by founding the Société d'Anthropologie de Paris, parent of our own and the leading Continental societies for the study of man.

It is well known that the period from the unknown date of man's appearance in Europe until about the Christian era is divided by antiquarians into the Ages of Stone, Bronze, and Iron. Such a division, anticipated nearly 2,000 years ago by Lucretius in his immortal poem, *De Rerum Naturâ*,[1] is not restricted

[1] "Arms of old were hands, nails, and teeth and stones, and boughs broken off from the forests, and flame and fire, as soon as they

to one quarter of the globe, but holds good for every part habitable once, or inhabited now, a mass of ever-increasing evidence being producible to show that the use of stone and other accessible and pliable materials preceded that discovery of metals which placed so powerful an instrument of control and advancement in the hands of mankind. These divisions of stone and metal-using periods, it should be borne in mind, are not to be applied to all parts of the world at one and the same time, as if there had been a universal and cotemporaneous abolition of stone at a given epoch in human history, and a universal adoption of the compound metal, bronze, in its place. In the later periods of the Stone Age, it is certain that Europe was occupied by races in markedly varying degrees of civilisation. The people settled along the shores of the Mediterranean were far ahead of those scattered over Northern Europe, iron being probably known to the former, while the latter still used ground and polished stone implements, or bartered the much-prized amber for Etruscan and Phœnician bronze. So in the present day, widely as metals are dispersed

had become known. Afterwards the force of iron and copper was discovered ; and the use of copper was known before that of iron, as its nature is easier to work, and it is found in greater quantity. . . . . Then by slow steps the sword of iron gained ground, and the make of the copper sickle became a byeword ; and with iron they began to plough through the earth's soil, and the struggles of wavering war were rendered equal." — Book v. 1,282 (Munro's Trans., p. 268).

by traders, we find barbarous races who still make shift with tools and weapons of stone.

Again, the exact chronological succession is somewhat confused by the fact that the use of stone instruments for ceremonial purposes long survived the introduction of metal. The Egyptian embalmers made the first incision into the side of the corpse with a stone knife, and references occur in the Old Testament to the use of stone knives in the rite of circumcision (*cf.* Exod. iv. 25; Josh. v. 2), which is, under certain conditions, now performed with a fragment of flint or glass. Of the sanctity which gradually creeps over things when their original purpose is forgotten or mystified, we have illustration in certain ecclesiastical vestments. The *alb* is but the white shirt or tunic still kept up in the white dress of the Pope, which used to be worn by every peasant next his skin, and in southern countries was often his only garment. The overcoat in the days of the Roman Empire, as in ours, was constantly changing its fashion and its name. One such overcoat was the cape or *cope*, also called "pluvialo," the "waterproof." Another was the "casula," the "little house," as the Roman labourer called the smock-frock in which he shut himself up when out at work in bad weather,[1] and which survives in the *chasuble*, wherewith the Roman Catholic and the Ritualist priest alike decks himself before celebrating mass.

[1] Dean Stanley's "Essays on Church and State," p. 259.

But it is more important for our present purpose to point out what is not so well known, namely, that the subdivision of the Stone Age into the Palæolithic or Older, and the Neolithic or Newer, marks a difference between these which is in every respect greater than that between the Neolithic and succeeding ages. Whilst these latter cover a comparatively trifling, although crowded, span of man's tenancy of Europe, and one over which the line of his advance is, if dim and zigzag, unbroken, the Palæolithic is of remote origin, of unknown, but certainly vast, duration, and but sparsely marked with the traces of his presence. The men of Neolithic times, concerning whom Mr. Grant Allen has given a vivid and accurate sketch,[1] are the direct ancestors of peoples of whom remnants yet lurk in out-of-the-way corners of Europe, where they have been squeezed or stranded; but the men of Palæolithic times can be identified with no existing races; they were savages of a more degraded type than any extant; tall, yet barely erect, with short legs and twisted knees, with prognathous, that is, projecting, ape-like jaws, and small brains. Whence they came we cannot tell, and their "grave knoweth no man to this day." The implements of the ancient Stone Age, mainly of flint, sometimes of chert (an impure, flint-like quartz), coarse, rough-chipped and unpolished, can never be confounded with those of the later age, which are made of divers native or imported materials ground to

[1] See *Knowledge*, vol. i. pp. 351, 550; vol. ii. p. 4.

a fine edge and polished, often exquisitely shaped, and highly ornamented. Whilst those of Neolithic times are found in surface remains, cavern-floors, camps, temples, tombs, and mounds, from stately tumuli to rubbish-heaps on the Baltic coasts, all more or less within the province of the antiquary, those of Palæolithic times are unearthed by the geologist from ancient river-valleys, from "caves and dens of the earth," and from deposits so venerable, that their contents demand a far higher antiquity for man than many anthropologists, by no means the slaves of Archbishop Ussher's chronology, are as yet willing to allow. Between the Older and the Newer Stone Ages there is fixed the great gulf of climatal change and of altered distribution in land and water; for while the early, if not the earliest, Neolithic immigrants into Britain traversed a continent which, certain northern parts excepted, has undergone only local changes since they crossed it on their westward path, Palæolithic man passed without hindrance where now flows the English Channel; the mainland stretched northwards beyond Ireland and Iceland; through a forest-covered area, over which the German Ocean rolls, ran the Rhine, its waters swelled by streams now known as the Thames and Humber, to empty itself in the North Atlantic. The whole of Northern Europe was covered with ice-fields whose glaciers fed rivers of greater volume than those born of their shrunken and shrivelling successors of Norway and the Alps; southward the continent was joined to Africa at Morocco and Tunis, dividing

the Mediterranean into land-locked seas, and making easy passage for man and brute from tropical to cooler zones. Whilst the animals brought by Neolithic races from the East were, in the main, of species familiar to ourselves, those with which Palæolithic man waged war in forest and swamp were mammals now wholly extinct, or found only in arctic or tropical latitudes. The curious admixture with human relics of remains of animals adapted to widely different regions has raised some interesting questions concerning the causes of duration of changes in climate which permitted, now northern species (as the mammoth or woolly-haired elephant, the musk sheep, the reindeer, etc.), now southern species (as the hippopotamus, hyæna, lion, etc.), to roam over the same areas, finding at last a common grave. But to discuss this at present would be to digress.

The above outline of the leading contrasts between the two Stone Ages may suffice to show that our subject lies far beyond the historic horizon. Ordinary landmarks and methods of reckoning, therefore, failing us, we can have some idea of man's place in geological time only by ascertaining the relative position of those deposits in which traces of him are believed to occur to the general system of organic-bearing rocks. Such traces are, in truth, indicated by what man has done, rather than by himself, for of him scanty are the relics—only a jaw-bone or fibula (small leg-bone) here, only a skull-fragment there, a paucity for which we must hereafter seek an explanation.

Vast as is the period in this world's history since the appearance of man even in Europe, it is but a fraction compared with that which extends from the beginning of life upon the earth to Palæolithic times. Hæckel[1] remarks that if we divide this into a hundred equal parts, and then, corresponding to the thickness of the systems of strata, calculate the relative duration of the five main divisions or periods according to percentages, we obtain the following result:—

Primordial Epoch	Laurentian System	53·6
(70,000 feet.)	Cambrian	
	Silurian	
Primary	Devonian	32·1
(42,000 feet.)	Coal	
	Permian	
Secondary	Trias.....	11·5
(15,000 feet)	Jura	
	Chalk	
Tertiary.....	Eocene	2·3
(3,000 feet.)	Miocene	
	Pliocene	
Quaternary (or Pleistocene)	Palæolithic Man...	0·5
(500 or 700 feet.)[2]	Neolithic and	
	Historical Period	

Now, it would be in defiance of all that the doctrine of evolution teaches, and, moreover, win no support from believers in special creation and the fixity of species, to seek for so highly specialised a mammalian as man at an early stage in the life-history of the globe.

[1] "Hist. of Creation," vol. ii. p. 20.

[2] The thicknesses of this and the other deposits are only approximately true.

Even in the Secondary Epoch, the only mammals which have been discovered in Europe are the fossil remains of a small marsupial or pouch-bearer; and although the placental mammals and the order of Primates, to which man is related, appear in Tertiary times, and the climate, tropical in the Eocene age, warm in the Miocene, and temperate in the Pliocene, was favourable to his presence, the proofs of his existence in Europe before the close of the Tertiary epoch, considered sufficient by many foreign *savants*, are not generally so regarded here.

It is at this point, however, that the interest of the matter deepens. No anthropologist of repute denies the *à priori* probability of man's presence in Europe under the favourable conditions of mid-Tertiary times; and the remembrance of what incredulity met the discovery in 1847 of relics indisputably of human origin, in hitherto undisturbed deposits in the Somme Valley, checks incautious and hasty treatment. Let us glance at the evidence on which the French advocates of Miocene man now rest their case. Recognising the enormous duration of the Palæolithic Age, one of the most eminent of their number, M. Gabriel de Mortillet, has divided it into several well-marked stages, certainly with such warranty as all that we have at hand in support of the slow rate of human advance gives. Of these divisions, five in number, M. de Mortillet places the earliest in the mid-Miocene period.

They are as follows:—[1]

Eolithic.....	Thenaisian...	Stone split by fire.	
Palæolithic..	Acheulian ...	Age of the Mammoth.	
	Mousterian...	„	Cave Bear.
	Solutrian ...	„	Reindeer and Mammoth.
	Magdalenian	„	Reindeer.
			The Cave period.

The evidence in support of the presence of man in Europe in mid-Tertiary times consists of worked flints found in the *Calcaire de Beauce*, a Miocene stratum at Thenay, in Loire-et-Cher, hence the term Thenaisian. The symmetrical form of the flakes; the "bulb of percussion," as it is called, *i.e.*, the conical projection at the end of a flint where the blow striking off a splinter is given; the rough chipping round the edges, and the traces of wear and tear, are cited by their discoverer, the Abbé Bourgeois, as proofs of human origin. Moreover, he believes that they were fractured by the aid of fire, or used as "pot-boilers,"[2] which would be conclusive evidence, if proved. But it is not placed beyond doubt that the flints may not have come from previously-disturbed and later deposits nearer the surface, which is strewn with stone implements, and although similar finds are recorded from the Miocene beds of the Tagus, and bones with

[1] Cf. "Matériaux pour l'Histoire de l'Homme" (second series), vol. ii. p. 545.

[2] In the absence of earthen or metal pots, we find the practice of dropping red-hot stones into vessels of skin, wood, or bark, widespread among ancient and modern savages.

apparently designed scratches and notches have been found in the faluns of Pouancé, the attitude of most anthropologists is to wait for additional evidence. "*Ex pede Herculem*," says the adage, "you judge Hercules by his foot," but even the foot of a Tertiary man "comes in such a questionable shape" that we cannot take his measure from it. Indeed, as the foregoing table shows, M. de Mortillet passes without pause from the relics of the Thenay beds to those of St. Acheul, which are within the Post-Pliocene, Pleistocene, or Quaternary period, as it is variously called, and which are now admitted as conclusive regarding man's presence in Western Europe by every anthropologist of repute.

But, before describing these in such detail as the importance of the matter demands, let us glance at the momentous changes in Europe which appear to have preceded the arrival of Palæolithic man. These may, in measure, account for the scantiness of material yet producible, and for the gaps in the sequence of geological monuments bearing on the past history of man. "If we consider," Sir Charles Lyell remarks,[1] "the absence or extreme scarcity of human bones and works of art in all strata, whether marine or fresh water, even in those formed in the immediate proximity of land inhabited by millions of human beings, we shall be prepared for the general dearth of human memorials in glacial formations, whether recent,

[1] "Antiquity of Man" (4th edition), p. 240.

Pleistocene, or of more ancient date. If there were a few wanderers over lands covered with glaciers, or over seas infested with icebergs, and if a few of them left their bones or weapons in moraines or in marine drifts, the chances, after the lapse of thousands of years, of a geologist meeting with one of them must be infinitesimally small."

At the close of the Pliocene Age, the land area was greatly enlarged by slow elevation. The German Ocean, which, during that period, had covered East Anglia, was "high and dry." As evidenced by the forest-beds traced from Cromer to Kessingland, oaks, firs, yews, birches, and smaller trees abounded; alders flourished in the congenial swampy land; water-lilies blossomed on the rivers from whose deposits the smacksmen on the Dogger Bank dredge up to-day vast numbers of bones of mammals then wallowing in the slime and roaming through the jungles—huge elephants, rhinoceroses, hippopotamuses, cave bears, wolves (cotemporaries, be it remembered, of man), and even "several large estuarine and marine mammalia, such as the walrus, the narwhal, and the whale."[1] But, as testified by strata superposed upon the Norfolk forest beds, the temperature gradually declined, until an arctic cold prevailed; the land once more sank beneath the "azure main," and the long, though intermittent, reign of the Ice Age set in. The effects of this in the rounded hills of our island, the *roches*

[1] Lyell, "Antiquity of Man," p. 258.

moutonnées of the Continent (so called from their resemblance to sheep lying down); in the striated or grooved and polished rock-surfaces; in the erratic blocks—"foundlings," as the Swiss happily name them—deposited in districts far from their parent rocks, as for example, the occurrence of Scandinavian boulders on the plains of Saxony; in the mounds of sand and gravel, and the deposits of "till" or clay crammed with stones of all sorts and sizes, and scantily charged with derived and broken fossils, were long the puzzle and problem of geology, and the source of numberless legends. They were referred to every cause except the true one, until Agassiz, after long study of glacial action in Switzerland, proved them to be due to the mechanical effects of ice. What brought about such alterations of climate as to swathe the northern hemisphere in a vast ice-sheet at one period, and to clothe it within a few degrees of the pole with the vegetation of temperate climes in another period, is explained to the satisfaction of most competent judges by Dr. Croll's theory.[1] That is to say, at certain periods, irregular in their recurrence, the earth's orbit becomes much more elliptical, and its distance from the sun correspondingly greater. If, when this period of greatest ellipticity happens, the incidence of the seasons has been changed by the

[1] "On the Physical Cause of Change of Climate during Geological Epochs" (*Phil. Mag.*, August, 1864); and, for further treatment, "Climate and Time."

precession of the equinoxes,[1] the summer would be too brief to undo the work of the long winter, and ever-increasing accumulations of snow and ice would result. In the course of thousands of years, these conditions would be reversed, and the climates of northern and southern hemispheres change places.

Such is, in brief, the explanation of those remarkable conditions which either beset or immediately preceded palæolithic man, and, only staying to remark that, with subsequent upheaval of the land, Britain was once more joined to the Continent, we may pass without further break of story to the sure ground where his "works follow him."

More than fifty years ago, many of the bone-caves of England and Belgium had been explored, but it was not until 1847 that the Torquay Natural History Society embodied the results of their labours in Kent's Hole, in a paper which was sent to the Geological Society. What obtuseness to the momentous revolution in current beliefs as to the antiquity and primitive state of man, which these and like discoveries involved, the Council of that learned body displayed, is shown in this laconic entry in their Quarterly Journal, "On Kent's Cavern, near Torquay. In this paper an account was given of some recent researches in that cavern by a committee of the Torquay Natural History

[1] See *Knowledge* No. 11, p. 218, for an admirably clear explanation of this complex movement by the Editor. Cf. article by Mr. Burr, "Intellect. Obs.," vol. iii. pp. 354, *et seq.*

Society, during which the bones of various extinct animals were found in several situations."

They were not alone in lacking that "lucidity" which permitted them to accord to an individual patriarch nearly a thousand years of life, yet constrained them to deny to the race more than six thousand years' tenancy of this planet, as if the Hebrew numbers, elastic as they are under the caprices or errors of copyists, were more trustworthy than the undisturbed records of the rocks.

Nor did they manage these things better in France. In the same year (1847) M. Boucher de Perthes called attention to the discovery of some rudely-shaped flint implements in pits which were being worked for sand and gravel in the Somme valley, near Abbeville. They had been found at intervals during the preceding six years in such positions, and so far below the surface, as to convince him that they were not later, but probably much earlier, than the deposits in which they were embedded, and in which were also found bones of the mammoth, woolly-haired rhinoceros, and other extinct animals. M. de Perthes argued that these worked flints had been fashioned by man, and witnessed to his high antiquity and low level of culture. But he was met with the reply that these so-called tools and weapons were either natural fractures or forgeries, and an account of similar finds of "instruments en silex" in the Drift at St. Acheul (hence the term Acheulian), near Amiens, which was published by Dr. Rigollot in 1855, met with the same reception.

A dozen years elapsed before *savants* on both sides of the Channel confessed themselves mistaken. In 1858–9, some English geologists, stimulated by discoveries in Brixham Cavern, examined M. de Perthes's collection of implements, and the beds in which they were said to have been found. "In addition to being perfectly satisfied with the evidence adduced as to the nature of the discoveries, they had the crowning satisfaction of seeing one of the naked flints still *in situ* in its undisturbed matrix of gravel, at a depth of seventeen feet from the original surface of the ground."[1] An impetus was thus given to further research, and not only were discoveries of similar implements (presumably, from their general resemblance of form, of the same age, and shaped by the same race of men,) made in England in beds of gravel, sand, and clay, for the most part on the slopes of our existing river-valleys, but it was ascertained that flint implements had been disinterred at the end of the last century from the Waveney Valley, in Suffolk, only to be, as it were, re-interred in the Museum of the Society of Antiquaries. The earliest known find of a flint in the drift was in the Thames Valley, probably at the close of the seventeenth century. It is said to have been found with the tooth, or, according to another account, the skeleton, of an elephant, near Gray's-Inn-lane, and is preserved in the British Museum. But it would be easy to convert this paper into a dry cata-

[1] Evans's "Ancient Stone Implements," p. 478.

logue of discoveries, and to avoid that prosaic result, it suffices to say that implements of stone,—leaf-shaped flakes, removed from flints by blows or pressure, and apparently intended as knives and scrapers; pointed weapons analogous to lance or spear-heads; oval or almond-shaped weapons, with cutting edge all round,—have been found by thousands in the Drift of England and the Continent. This river-drift is formed of alluvial deposits brought down by that unresting, yet unhasting action of rain and flood which is for ever deepening the bed over which the waters flow. Since the time when the men of the Acheulian period lived in France, the Somme has cut down its valley one hundred feet,—a result which requires an enormous antiquity for the flint implements found in the undisturbed gravels. The bottom of that valley has yielded polished stone weapons and other remains further illustrating the vast lapse of time between the Ancient and Newer Stone Ages—vast, even after making full allowance for a more rapid action of rain and flood in the Quaternary period than now.

Scanty as are the bones of Palæolithic man, no unprejudiced person can deny that the tools and weapons of the Drift are products of human skill, low in the scale as this may be; for they have defined, purposeful shapes, which were artificially produced, because they can be thus formed only by the application of blows or of pressure in a peculiar way, as modern experiments show. Moreover, they indicate selection on the part of their fashioners, since they

cannot be made from every kind of flint. They are found, in striking correspondence of form, wherever man is known to have wandered, or may be presumed to have wandered, over the earth[1]—in the alluvials of the East, the laterite or brick earth of Madras; in the river-gravels of sacred and classic lands, by the Sea of Galilee, and along the valley of the Tiber; in brief, in every explored part of the Old and New Worlds "from China to Peru." They witness to the wide distribution of rude tribes of hunters in the lowest stage of culture, of whose aboriginal home we can only speculate, of whose ultimate fate nothing whatever is known.

> Into this Universe, and *why*, not knowing,
> Nor *whence*, like water willy-nilly flowing;
> And out of it, as wind along the waste,
> I know not *whither*, willy-nilly blowing.[2]

The description of rude Northern tribes given by Tacitus may not unfitly—rather with added force—be applied to them. "They are wonderfully savage and miserably poor. They have no weapons, no horses, no homes; they feed on herbs, and are clad with the skins of beasts; the ground is their bed, and their only hope of life is in their arrows, which, for lack of iron, they sharpen with tips of bone. The women live by hunting, just like the men, for they accompany

[1] Scandinavia must be excepted, the finds there being exclusively Neolithic.

[2] Rubáiyát of Omar Khayyám, xxix.

the men in their wanderings and seek their share of the prey. And they have no other refuge for their young children against wild beasts or storms than to cover them up in a nest made of interlacing boughs. Such are the homes to which the young men return, in which the old men take their rest."[1]

The implements of the ancient Stone Age are certainly not more recent than the water-laid beds in which they are found hitherto undisturbed, and the height of these, ranging from 50 ft. to as much as 200 ft. in some places, above the present river-levels, is proof of enormous antiquity. An approximate estimate of the time required for the deepening of a valley is furnished by the quantity of sediment carried yearly by the river flowing through it to the sea. The data at hand for this result are slender, but Professor A. Geikie shows that the removal of one foot of rock occupies in some cases a few centuries; in others as many chiliads. For example, the Po appears to lower the surface of the area drained by it at the rate of one foot in 729 years, while the Mississippi takes 6,000 years to effect a like result. And although the larger volume and flood of the Pleistocene rivers—betokened by the coarse gravel, the large unrolled stones, and the mingled remains of different species of animals which alternately occupied the land, as the climate of Pleistocene times was now genial, now arctic—scooped out the valleys at a

[1] "Germania," c. 46.

quicker rate than the rivers of to-day, the removal by the Somme, for example, of masses of chalk and overlying Tertiary *débris* (of which its valley entirely consists) to the depth of 150 ft., through a channel many miles in length, demands an immense period. Subsequent to this, what vast lapse of time is required to explain the gap between the Drift and the early pre-historic period when the polished stone-using peoples arrived, so that, as Dr. Evans remarks, "we must, for the present at least, judge of the antiquity of these deposits rather from the general effect produced upon our minds by the vastness of the changes which have taken place, both in the external configuration of the country and its extent seaward, since the time of their formation, than by any actual admeasurement of years or of centuries."[1]

But these implements of the river-gravels do not tell the whole story about Palæolithic man. Speaking broadly, he falls into two divisions—Drift-man and Cave-man; the tools and weapons found in the limestone caverns of Western Europe marking a distinct advance, perchance due to another race, over those of the earlier period. For while, as has been remarked, the gravel-beds yield only oval-shaped flints and leaf-shaped flakes, the caves furnish flint saws, lance-heads, awls, barbed weapons, bone needles (in one place a stone drill lying near them), imbedded with charcoal and the *débris* of animals eaten, as the musk

[1] "Ancient Stone Implements," p. 621.

sheep, bison, and others, especially the reindeer. From the enormous numbers of this creature, which appears to have formed the chief food of the rude hunters, the cave deposits are often spoken of as belonging to the Reindeer period, in contradistinction to the Drift or Mammoth period. The precedence of decoration over dress, noticeable among savages, perhaps finds illustration in rude strings of animals' teeth and shells; while a soft red ochre (oxide of iron), which occurs among the relics, shows that the Reindeer men painted their skins. But we are anticipating.

From the earliest times, "the clefts of the valleys, the caves of the earth, and in rocks," have formed the natural shelters of barbaric races. And, although the traces of bone and other relic-yielding caverns of Tertiary and early Quaternary times appear to have been swept away in the momentous changes of land surface, the caverns of subsequent periods are rich in remains which enable us to construct a more vivid outline of man in the ancient Stone Age than do the scanty and rude relics of the Drift. Implements of the Drift type occur among the oldest layers in caverns, but the upper deposits supply the evidence of advance to which reference has been made. Following M. de Mortillet's divisions for a moment, the Thenaisian and Acheulian epochs embrace the Drift period; the Mousterian, Solutrian, and Magdalenian epochs the Cave period. Not that these latter divisions are to be taken as hard and fast, but as

overlapping, because they may, in fact, represent no great difference or extended succession of time. And for the present purpose it is better that in place of explanation of, or comment upon, the method of selecting specific implements as types of each period adopted by M. de Mortillet, an account be given of the deposits and contents of one of our most celebrated English caverns, promising that these will afford a fair idea of the bone-caves and rock-shelters of the Continent, except where the latter have furnished certain remarkable specimens of primitive art to be presently referred to.

Before entering our cave, which shall be Kent's Hole, near Torquay, let us briefly explain how the deposits in it, and in like caverns found in limestone rock, have been formed, because the almost imperceptible rate at which, in some cases, they have been laid down, has an important bearing on the age of the contents imbedded within them. The surface-water finds its way through some crevice or fissure in the rock, and, being more or less charged with carbonic acid derived from the atmosphere and from decayed vegetable and other matter in the soil, becomes a very powerful solvent, under which the rock, converted into carbonate of lime, is carried away in solution. But, while much thus runs off, Nature, true to her cyclical action, begins to refill the cavity which she has eaten away. Drops of water, holding the lime in solution, ooze from the roof, and, falling on the floor, gradually form beds and bosses of stalag-

mite, which hermetically seal whatever *débris* may happen to be lying about, while such portions of the dissolved limestone as remain clinging to the roof after evaporation of the water, hang icicle-like therefrom, and gradually form the beautiful columns of stalactite which adorn many of the famous caverns of the world.

Kent's Hole, or Cavern, lies in a hill in the vale of Ilsham, about a mile eastward of Torquay Harbour, and half a mile from the coast. It comprises, as the openings in the face of the cliff indicate, two caverns which run parallel with each other, widening here and there into chambers to the extreme limit, when a passage connects them. An inscription in one of the chambers, known as the "Cave of Inscriptions," shows that some curious traveller had wandered into its recesses nearly 200 years ago, and it was partially surveyed in 1825 and following years; but it is to the systematic research and unceasing superintendence of Mr. Pengelly, since 1865, that we owe that full knowledge of its contents from which irrefragable conclusions concerning the high antiquity of man in this quarter of the globe are drawn.

Entering the eastern division, to which the labours of Mr. Pengelly and his committee have been restricted, we find the deposits to occur in the following order, beginning with the uppermost:—

NEOLITHIC.—1. Blocks of limestone, weighing from a few pounds to upwards of 100 tons, which have fallen from the roof under the action of frost, &c., and of which many are cemented together by

carbonate of lime, *i.e.*, stalagmite. 2. Black muddy mould, from three inches to as many feet in thickness; composed almost entirely of decayed vegetable matter.

PALÆOLITHIC.—3. Granular stalagmite, varying in thickness from a few inches to five feet. 4. Layer of charred wood, about four inches in depth, but occurring in one part of the cavern only, near the entrance. This is known as the Black Band. 5. Light red loam, called the Cave-earth, the actual depth of which, throughout, is unascertained, as the examinations have been limited mainly to a depth of four feet beneath the stalagmite. 6. Crystalline stalagmite, from three to twelve feet thick. 7. Dark-red sandy deposit quite free from limestone, in which quartz pebbles and fragments of grit are imbedded. This is called *breccia*.

In conveniently classifying these deposits by the animal remains found in them, Mr. Pengelly calls the two uppermost, which are included in Neolithic times, the *Ovine* period, because the sheep is never found below them, all the bones being those of animals still extant. The three deposits immediately below these, numbered 3, 4, and 5 in the above list, he calls the *Hyænine* period, because the bones of that animal predominate. The two lowest deposits he calls the *Ursine* period, because bones only of the cave-bear are found in them. Passing through the black mould, the varying contents of which lie within the province of the antiquary, we reach the uppermost layer of the Hyænine period, the bed of granular stalagmite. Mingled with the remains of various animals, more or less extinct, as the mammoth, cave-bear, cave-hyæna, &c., with shells of cockles and cuttle-fish, with charred wood and rounded pebbles; we find herein flint-flakes, implements, and cores, or flint-nodules

from which flakes have been struck; and, at a depth of twenty inches, a portion of a human upper jaw, containing four teeth, together with a fifth tooth lying near it.

The black band, the site where the cave-men kindled their fires for cooking, or perchance for warmth and for scaring wild animals, contained about three hundred and fifty flint flakes and cores, an abundance of charred wood, a bone awl, bone harpoon, and needle with a well-formed eye (in the Dordogne caves the stone implements were found with which the eyes were drilled in the needles), and the remains of rhinoceros, cave-hyæna, horse, ox, bear, &c.

The cave-earth was richest of all in the number of stone implements, and the abundance of teeth and bones. The flint implements were of a markedly higher type than those of the Drift, and, in their variety, suggestive of cave-man's fertility of resource, as compared with his predecessors, for the list includes well-worn stone hammers and whetstones, a bone pin, and barbed harpoons. The crystalline stalagmite contained bones of the cave-bear only, but in the breccia there were found, mingled with remains of that animal, implements of flint and chert, "much more rudely formed, more massive and less symmetrical in form than those obtained from the cave-earth and black band," and made, Mr. Pengelly adds, "by operating, not on flakes, but directly on nodules, of which portions of the original surface generally remain."

Before making brief reference to contents special to the bone-caverns of the Continent, it should be asked how the above bears out what was said above concerning the enormous duration and remoteness of the ancient Stone Age. Of its remoteness we find sufficing evidence in the deepening of the valley to the extent of between 60 and 70 ft. since man and his congeners had refuge in Kent's Hole, while the period demanded for this scooping out is itself limited when compared with the time required for the successive deposits in the cavern, and for the intermittent interruptions which they suffered by the streams of running water which, as the layers of loam and sand with their enclosed pebbles show, now and again entered the cave, disturbing the older deposits.

At first sight it may appear that an easy method of getting rough measure of the time involved in the deposition of stalagmite is at hand in watching the rate at which it goes on now. But no such criterion serves us, because the rate at which stalagmite accumulates varies extremely, being determined by states of climate, by air currents, by the quantity and quality of the water, by the greater or lesser porosity of the rock in course of dissolution, and other causes, marked variations of rate occurring even in the same cave. "In the Ingleborough Cave, in Yorkshire, it has been so swift that between 1845 and 1873 a stalagmitic boss, known as the Jockey Cap, has grown at the rate of ·2941 inch per annum;" but such a rate is

exceptional, as otherwise our caves would speedily have been filled up with such accretions.

That inscription, one among others, in Kent's Hole, to which reference is made above, does, however, help us somewhat in the matter. On the sloping side of a large boss of stalagmite, which rises from the floor, and which has been subject to the continuous drip of lime-charged water from the roof, this inscription is yet clearly to be read: "Robert Hedges, of Ireland, February 20, 1688." Evidence of its genuineness is at hand in the description of it left on record by the Rev. J. MacEnery, who explored the cavern in 1825. He says that "the letters are glazed over, and partly effaced," showing that they had not been recently cut. That description applies accurately to them now, after the lapse of sixty years. Now, the film of stalagmite over these is about one-twentieth of an inch in thickness, and the like applies to still older inscriptions in another chamber, round the "Crypt of Dates," the genuineness of which inscriptions there is no reason to doubt.

If we take as our standard of reckoning the rate at which the stalagmite has accumulated on the Hedges boss and apply it to the bed around it, which is in places five feet thick, we get a result as startling as it is probably excessive, because we have assumed uniform climatal conditions throughout. True, in his notice of the last edition of Lyell's "Antiquity of Man," Mr. Alfred Wallace, an authority not given to over-estimate, remarks that the sum of half a million

represents the years that have probably elapsed since flints of human workmanship were buried in the lowest deposits of Kent's Cavern,[1] and, after allowing a far more rapid rate for the formation of both the crystalline and granular stalagmites (to say nothing of intercalated deposits) than the evidence warrants, the estimate which demands the lapse of tens of thousands of years since the entombment of rude flakes in the breccia, cannot be gainsaid. Some words of Mr. Prestwich, in a paper read before the Royal Society, and which Mr. Pengelly has already happily quoted, may be repeated here. He says that, "just as though ignorant of the precise height and size of a mountain-range seen in the distance, we need not wait for trigonometrical measurement to feel satisfied in our minds of the magnitude of the distant peaks, so with this geological epoch; we see and know enough of it to feel how distant it is from our time, and yet we are not in a position at present to solve with accuracy the curious and interesting problem of its precise age."

The general character of the deposits in Kent's Hole resembles so closely that of the accumulations in bone-caverns of the Continent, that reference to these would be needless but for the presence in them of certain relics of palæolithic art which are rare in

[1] *Nature*, October 2, 1873.—It should be stated that Mr. Wallace's estimate rests on a misunderstanding, the accretion being reckoned by him at one-eighth of an inch, instead of one-twentieth of an inch, in 250 years. The estimate, however, remains sufficiently high to support the main argument.

English caves and, so far as is known, altogether absent from Neolithic deposits, as the "kitchen-middens" of the Baltic shores and the lake-villages of Switzerland. The exploration of rock-shelters in the Dordogne by Lartet and Christy brought to light a series of scratched or etched fragments of bone and stone remarkable for their graphic sketches of animals of the Reindeer period, and for their witness to the advance which Cave-man had attained over his predecessor of the Drift. That such work as this was done, implies not only the existence of the germs of art, but also leisure for their cultivation, and places man of the ancient Stone Age on a level of culture not inferior to that of savages yet extant.

On pieces of ivory, horn, schist, &c., we find rude but spirited pictures in outline, sometimes lightly shaded, of the ox, the horse, the cave-bear, man, and, as evidence of his wanderings to the coast, of the whale and seal. The attitude of the animal is often ingeniously adapted to the shape of the material, as in one specimen where the pre-historic, certainly pre-Raphælite, artist, working on a fragment of reindeer's horn, has doubled up the fore-legs under the belly and stretched out the hind legs along the blade of the poignard into which the horn was converted. But, among the many specimens unearthed, the most striking—if we except that of a reindeer feeding, which was found in the Kesslerloch Cavern, near Schaffhausen—is that of a mammoth, or woolly-haired elephant, on a fragment of ivory, the long hair and

curved tusks being faithfully drawn, while the feet are hidden, as it were, in the high grass through which the creature waded. That we are enabled to say the sketch is faithful, is owing to the discovery of frozen carcases of the mammoth in Siberia, with solidified blood and flesh—in fact, in such perfect condition, that even microscopical sections of some of the delicate internal tissues have been made from them.

With the materials from the bone-caves, we are able to compose a fairly distinct picture of the rude tribes which roamed over Europe at a period subsequent to the savages of the Drift, yet enormously remote from the earliest immigrants of the newer Stone Age. Leading the wandering life of tribes dependent for food on the chase, they camped out by the river-side under trees, or in huts built of branches, resorting, as need arose, to the surer protection of the cavern and the rock-shelter. With the barbed spears and arrows so common among their relics, they caught the fish and shot the fowl; trapping, stalking, as a sketch from the Duruthy case shows, or killing with ponderous stone weapons bigger game, as the reindeer, bison, horse, sometimes the mammoth, rhinoceros, and cave-bear. The flesh, cut into pieces with flint-knives, was cooked in vessels of wood or skin (for no traces of pottery occur), into which were dropped hot stones as "pot-boilers." The bones were split for the marrow. The skins, scraped with flints and sewn with bone needles threaded with

sinew, were welcome covering under the cold conditions of the Reindeer period—albeit, man was a more hairy creature than now, and, as portraits from the Pyrenees caves show, protected his hands with long gloves. Reference has been made already to indications of the use of "rouge" by Palæolithic ladies in the red oxide of iron found in English and Continental caves, and to this may be added the discovery of necklaces of skulls and teeth, some of these last of the lion and the bear. They were, perhaps, given as proofs of their daring by the "braves" of the period!

Absolutely ignorant as we are of the whence and whither of Drift-man, we are in like case respecting Cave-man, although able to fix with more precision the limits of his range. That he has no representatives among the races of Europe is certain, but from evidence based on kindred habits of life, artistic feeling and physical features inferred from relics—as, for example, the smallness of hand from the size of weapons and implements—some authorities regard the Eskimo as his lineal descendants, "banished now, like the musk-sheep, to the inclement regions of North America, and isolated from all other peoples." Similarities such as the above are, however, no sufficient proof of ethnical relationship, and no definite opinion for or against the connexion between Cave-man and the Eskimo can be given.

Such clue to determination of race as the remains of Palæolithic man themselves would furnish is un-

happily missing. The exceeding scarcity of human bones, both in the drift and in caverns, does not, however, affect the conclusions respecting man's high antiquity and primitive savagery drawn from relics of undoubted human origin imbedded in ancient deposits, and there are many reasons which explain that scarcity. A sufficing cause is at hand in the changes, vast in their cumulative effect, wrought upon the earth's surface by rain, frost, torrent, and chemical agents. Nature, so careful of the type, but "careless of the single life," is still less careful to preserve its dead framework; and when we remember that all her energies work for its conversion to uses of the living, we cease to wonder at the imperfection of the geological record and at the small proportion of fossil remains of organisms, even of the giant reptilians of Secondary times and the huge mammalians of Tertiary times. The numerical inferiority of man to the animals surrounding him, especially hyænas, which would spare none of his bones, further explains their absence, as does the fact cited by Sir John Lubbock, that in the gravel-beds of St. Acheul, "no trace has ever been found of any animal as small as man. The larger and more solid bones of the elephant and rhinoceros, the ox, horse, and stag, remain, but every vestige of the smaller bones has perished." Coming to our own time, when the Lake of Haarlem, on which there had been many wrecks and naval engagements, was drained, only very scanty fragments of Spanish and other

vessels were found in it, and not a single human bone.

When we contrast man's fragile body with the imperishable nature of his earliest implements, the sparseness and fitfulness of his presence with their countless numbers and continuous use over an enormous range of time, the scantiness of the one and the abundance of the other banish our surprise, while not lessening our regret.

In the cave deposits, of which only the merest outline has been given above, we touch the last traces of man's presence in the Palæolithic Age. As already set forth, the great gulf of altogether different physical and climatal conditions separates him from the Neolithic races, between whom and the European peoples of to-day some trace of continuity may be faintly discerned. Yet the connexion between the two is not to be severed, and the testimony yielded by the chipped flints of the one and the polished axes of the other points in the same direction; that is, that the primitive state of mankind was one of savagery, that the farther back inquiry is pushed in every habitable quarter of the globe, such culture as exists is found to have been preceded by barbarism; and that the savage races of to-day represent, not the degradation to which, as many assert, man has sunk, but the condition out of which all races above the savage have emerged.

Be it noticed that the sole hindrance among us to the general acceptance of a conclusion such as this,

based upon irrefragable evidence and in accord with the "cloud of witnesses" to a general progress from a lower towards a higher, is the authority of an ancient Semitic legend, the relation of which to earlier legends of the East is now established. But the issue is not uncertain. The tacit acceptance of results of astronomical and geological research, equally irreconcilable with any fair interpretation of Bible statements as to the rapid creation of the universe, and the subordinate position of the sun and stars to the earth, will be extended to the conclusions of prehistoric archæology. And in substituting for the cheerless theory of Divine purpose frustrated to this day the theory of Divine purpose unfolding itself through all the travail of the ages, men will at last, like the prophet of old, bless that which they came to curse.

DR. J. W. DRAPER (OBITUARY).

BY RICHARD A PROCTOR.

AMONG the distinguished men whose acquaintance I have made during my lecture tours in this country, America, and Australasia, few occupy a higher place in my recollection than Dr. J. W. Draper. His scientific researches and literary work are justly regarded by those whom we must consider as his fellow-countrymen

(though he was an Englishman by birth) as most important and valuable, and his name is not honoured in America only, but throughout the world.

John William Draper was born at St. Helen's, near Liverpool, in 1811, and educated there and at the London University (to which he was sent to study chemistry when the University was first opened). He left England soon after for America, and completed his medical education at the University of Pennsylvania, graduating in 1836. He was soon after appointed Professor of Chemistry in Hampden Sydney College, Virginia, and in 1839 in the University of New York.

His earliest contributions to Science were on the chemical action of light, on which he published nearly forty memoirs. The following summary of his work on this subject is from a biographical sketch which appeared in the *Popular Science Monthly*, in January, 1874 (about the time when I first made Dr. Draper's acquaintance). I believe that though they may have been editorially revised by my esteemed friend Professor Youmans, they were in substance communicated by Dr. Draper himself, thus possessing a special value at the present time, when some of his most important researches are bearing fruit which others are claiming as their own :—

"Of all the chemical actions of light, by far the most important is that of the decomposition of carbonic acid by the leaves of plants, under the influence of sunshine. On this the whole vegetable world



DR. J W DRAPER.

depends for its growth, and the whole animal world, directly or indirectly, for its food. The decomposition in question is essentially a deoxidation, and up to about 1840 it was generally supposed to be due to the violet rays of the spectrum, which, in accordance with the views held at that time, were regarded as producing deoxidising actions, and were consequently known as deoxidising rays. But this was altogether an assumption unsupported by experimental proof. Professor Draper saw that there was but one method for the absolute solution of the problem, and that was by causing the decomposition to take place in the spectrum itself. In this delicate and beautiful experiment he succeeded, and found that the decomposition was brought about by the yellow rays, at a maximum by those in the vicinity of the Fraunhofer fixed line D, and that the violet rays might be considered as altogether inoperative. The memoir containing this result was first read before the American Philosophical Society, in Philadelphia, and immediately republished in London, Paris, and Berlin. It excited general interest among chemists. Even so late as 1874 it furnished to the German experimenters the basis of a very interesting discussion in photo-chemistry.

"In 1842 Dr. Draper discovered that not only might the Fraunhofer fixed lines in the spectrum be photographed, but that there exists a vast number of others beyond the violet, which up to that time had been unknown. He also found three great lines less refrangible than the red, in a region altogether invisible

to the eye. Of these now lines, which more than doubled in number those of Fraunhofer, he published engravings. He also invented an instrument for measuring the chemical force of light—the chlorhydrogen photometer. This was subsequently extensively used by Bunsen and Roscoe in their photochemical researches. In their paper, read before the Royal Society in 1856, they say, 'With this instrument Draper succeeded in establishing experimentally some of the most important relations of the chemical action of light.'

"His memoir 'On the production of Light by Heat,' published in 1847, was an important contribution to spectrum analysis. Among other things it gave the means for determining the solid or gaseous condition of the sun, the stars, and the nebulæ. In this paper he established experimentally that all solid substances, and probably liquids, become incandescent at the same temperature; that the thermometric point at which such substances are red-hot is about 977° Fahr.; that the spectrum of an incandescent solid is continuous, it contains neither bright nor dark fixed lines; and from common temperatures up to 977° Fahr., the rays emitted by a solid are invisible, but at that temperature they impress the eye with the sensation of red; that the heat of the incandescing body being made continuously to rise, other rays are added, increasing in refrangibility as the temperature ascends; and that, while the addition of rays so much the more refrangible as the temperature is higher is taking place,

there is an augmentation in the intensity of those already existing. This memoir was published in both American and European journals. An analysis of it was read in Italian before the Royal Academy at Naples, July, 1847, by Melloni, which was also translated into French and English. But, thirteen years subsequently, M. Kirchhoff published, in a very celebrated memoir, considered by many as the origin of spectrum analysis, and of which an English translation may be found in the *London and Edinburgh Philosophical Magazine*, July, 1860, the same facts under the guise of mathematical deductions, with so meagre a reference to what Draper had done, that he secured the entire credit of these discoveries. In an historical sketch of spectrum analysis subsequently published, Kirchhoff avoided all mention of his American predecessor.

"Dr. Draper was the first person who succeeded in taking portraits of the human face by photography. This was in 1839. He published a minute account of the process at a time when in Europe it was regarded as altogether impracticable. He also was the first to take photographs of the moon, and presented specimens of them to the New York Lyceum of Natural History, in 1840.

"'A Treatise on Human Physiology, Statical and Dynamical,' became a standard text-book in American colleges. It has passed through a great many editions, and was translated into several foreign languages. The Russian edition is used in the higher schools of

that country. A yet more important work is his 'A History of the Intellectual Development of Europe,' thus described in the *Westminster Review*:—'It is one of the not least remarkable achievements in the progress of positive philosophy that have yet been made in the English tongue: a noble and even magnificent attempt to frame an induction from all the recorded phenomena of European, Asiatic, and North-African history.'" [Of this treatise, Dr. Draper's later work, "The Conflict of Science and Religion," may be regarded as in some sense an abstract. It is severe in its treatment of religious intolerance and dogmatism, and does not seem to do full justice to the motives which in many cases have actuated religious persecutions. But the book is the product of a healthy and vigorous mind, and setting aside the undue hardness of its tone in certain places, it must be regarded as a work which has done, and is calculated to do, an immense deal of good.]

"Though in his earlier years Dr. Draper was a skilful mathematical analyst, he has published but few mathematical papers, the most important being an investigation of the electrical conducting power of wires. This was undertaken at the request of Prof. Morse, at the time he was inventing his telegraph. The use made by Morse of this investigation is related by him in 'Silliman's American Journal of Science and Arts,' December, 1843. The paper shows that an electrical current may be transmitted through a wire, no matter what the length may be, and that, generally,

the conducting effect of wires may be represented by a logarithmic curve. Among electrical memoirs there is one on the tidal motions exhibited by liquid conductors, and one on the electro-motive power of heat, explaining the construction of some new and improved forms of thermo-electric batteries. An abstract of these improvements is given in the last edition of the 'Encyclopædia Britannica' (Art. Voltaic Electricity).

"Dr. Draper was the first person to obtain photographs of the diffraction spectrum given by a grating, and to show the singular advantages which that spectrum possesses over the prismatic investigations on radiations. In a memoir on the production of light by chemical action (1848), he gave the spectrum analyses of many different flames, and devised the arrangement of charts of their fixed lines in the manner now universally adopted. A memoir on phosphorescence contains the experimental determination of many important facts in relation to that property. Among purely chemical topics he has furnished a method for the qualitative determination of urea by nitrous acid."

[From 1860 to 1870 Dr. Draper did but little in scientific research, devoting himself mostly to historical works. During this time he published his "History of the American Civil War," in three volumes.]

"In the summer of 1870, Dr. Draper suffered a severe bereavement in the loss of his wife. Of Brazilian birth, she was connected with an ancient and noble Portuguese family. She had rendered his domestic life

a course of unbroken happiness, and doubtless she was the examplar before his eyes when he wrote that oft-quoted passage in his 'Physiology,' in which, after depicting the physical and intellectual peculiarities of woman, he says: 'But it is in the family and social relations that her beautiful qualities shine forth. At the close of a long life, checkered with pleasures and misfortunes, how often does the aged man with emotion confess that, though all the ephemeral acquaintances and attachments of his career have ended in disappointment and alienation, the wife of his youth is still his friend? In a world from which everything else seems to be passing away, her affection alone is unchanged; true to him in sickness as in health, in adversity as in prosperity, true to the hour of death.'"

Of their six children, one died in infancy; the survivors are three sons and two daughters. Of the former, the eldest, Dr. Henry Draper, Professor of Natural History in the College of the City of New York, is eminent as a physicist and astronomer; the second, Dr. John C. Draper, is Professor of Physiology in the University of New York; the third, Dr. Daniel Draper, is Director of the Meteorological Observatory in the New York Central Park, where he has exercised an important influence in developing the meteorological system of the United States. In recent years, Dr. Draper published two short memoirs: one on the "Distribution of Heat in the Spectrum," showing that the predominance of heat in the less refrangible

regions is due to the action of the prism, and would not be observed in a normal spectrum, such as is formed by a grating; and that all the rays of light have intrinsically equal heating power; the second an investigation of the distribution of chemical force in the spectrum. The *Popular Science Monthly* notes to his credit that "these scientific researches, to which so many years of his life have been devoted, *have been at his own expense; he has never received any extraneous aid, though many of them have been very costly; he has never taken out any patent, but has given the fruits of his investigations and inventions freely to the public.*"

ILLUSIONS.

BY THOS. FOSTER.

THE senses are the means by which, directly or indirectly, all observations are made, and science can only make real advance in so far as it is based on observation and experiment. It is most important, therefore, that either our senses should be trustworthy in their action, that is, should give us true information, or (if they neither are absolutely trustworthy originally, nor can be so trained as to become so) that we should be able to test and to correct their indications.

Now it very soon appears, when we put the matter

to the test, that the direct evidence of the senses is not to be accepted without careful cross-examination. The science of our day may be regarded as having been established in opposition to the apparently obvious evidence of the senses. Take, for instance, astronomy. Nearly everything that the eyes tell us about the heavenly bodies, and nearly all that the sight and touch tell us about the earth (so far as astronomy has to deal with the earth as one of the planets) is false. Not one of all the stars we see in the skies is really where we see it. The earth seems flat, large, and fixed; it is really a globe, small compared with the seemingly small stars, and it is moving in many ways, not one of which the senses correctly appreciate. It is the same with other sciences.

We are not concerned, however, to discuss here how far the apparent teaching of the senses has to be analysed before its real meaning can be understood. The examples illustrating this would cover the whole range of science. For instance, to show how the real place of a star can be determined– more or less exactly—from its apparent place in the sky, we require to discuss the laws of refraction, aberration, the proper motion of stars, and a number of other matters. In such cases as this, though what the eye tells us is in a sense incorrect, the eye is supposed to do its work correctly. The eye tells us *truly* that the rays received from the star by it have come in such and such a direction, and what science has really to do is to determine in what direction those rays must have

set out, in order, after various changes of direction due to the various media through which they passed, to reach the eye, situate on a moving and rotating body like the earth, in the direction which they had—or at least seemed to have—or, more strictly, in order to produce an image of the star on such and such precise part of the retina.

But there are many cases in which the senses seem actually to convey false information, the eye telling us wrongly about the shape, size, position, &c., of an object, the touch deceiving us as to its form and qualities, the hearing, the smell, the taste, each in its own way deceiving us. It is such cases as these that I propose to examine. It is most important for the student of science that he should be aware of the various forms of error into which the direct action of the senses may lead him. I could cite instances where, for want of precisely such information, the student of science has been at the pains to explain a phenomenon which had no real existence, or which was precisely the reverse of the truth. Mr. Proctor mentions somewhere a case where a French astronomer (Chacornac) was careful to explain *why* the edge of Jupiter's disc is brighter than the middle, the fact being that the middle is brighter than the edge, the apparent brightness of the edge being a mere delusion. It may be added that the discussion of the class of illusions referred to is full of interest. The reader will find that the careful consideration of the cause of illusions will generally suggest other illusory experiments,

sometimes more striking than those here described. There are few occupations more interesting as pastimes, and at the same time more instructive, than the invention and testing of various forms of illusion.

It should be mentioned at the outset that such illusions as these are wrongly called sensory illusions. As Huxley points out, "there is no such thing as a fictitious or delusive sensation. . . . . But the judgments we form respecting the causes and conditions of the sensations of which we are aware, are very often erroneous and delusive enough; and such judgments may be brought about in the domain of every sense, either by artificially-contrived combinations of sensations, or by the influence of unusual conditions of the body itself." He adds, "mankind would be subject to fewer delusions than they are, if they constantly bore in mind their liability to false judgment. Men say, 'I felt,' 'I heard,' 'I saw' such and such a thing, when, in ninety-nine cases out of a hundred, what they really mean is, that they judge that certain sensations of touch, hearing, or sight, of which they were conscious, were caused by such and such things." It is precisely this lesson which I want to enforce here.

The simplest illusions are those affecting straight lines, causing them to appear crooked or curved, or *vice versâ*.

Take, for instance, the case illustrated in Fig. 1. Here the parts of the broken line AD appear to be parallel, but not—as they really are—in the same

straight line. The part CD seems lower than the true prolongation of the part AB. The explanation of this is not so obvious as in some less simple cases which I shall consider further on. Manifestly, the mind recognises that, owing to the interposition of the space EH, the point where the prolongation of AB should appear must be lower down than B, but it under-estimates the allowance to be made on this account. This is equivalent to saying that the eye under-estimates the breadth of the strip EH. Why should this be? It seems to me it is because the space EH appears to lie above the plane containing AB and CD, so that the real breadth of EH is unconsciously judged to be less than it really is; for, of course, a strip nearer the eye than EH is, would *seem* broader than EH if really of the same breadth, and if seeming *no broader* than EH, would really be of less breadth. The eye judges that EH *is* nearer, and infers unconsciously that it is of less breadth than EH really is.

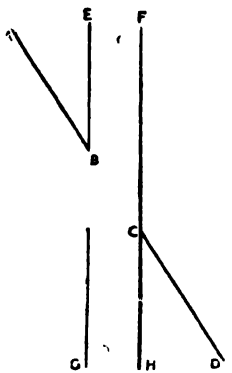


Fig 1.

Let us test this explanation, first seeing whether a strip which breaks a curve, as EH breaks the straight line AD, really seems nearer to the eye than the curve.

Describe a semicircle AD (Fig. 2) broken at BC, and between B and C draw the outline of strip BF as

in the figure. We see at once that the space BF appears to be nearer the eye than the semicircle ABD. Doubtless the judgment unconsciously reasons that the strip which breaks the outline ABCD must lie upon the semicircle and hide the portions wanting.

Again, it seems to me and to some others, but not to all to whom I have shown Fig. 2, that the figure formed by carrying on the curves AB, DC, to meet over space BC would not be a complete circle, but

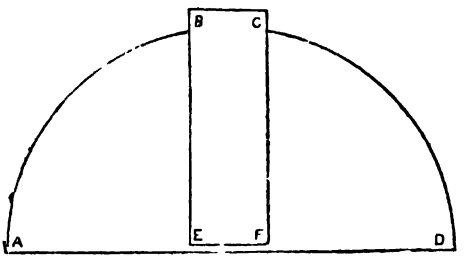


Fig. 2.

somewhat contracted horizontally. This would correspond with the above explanation of the illusion illustrated in Fig. 1. As, however, all eyes do not recognise this second illusion of Fig. 2, let us modify the experiment, noting that the same eyes which might not recognise an illusion apparently affecting breadth only, would readily be affected by an illusion affecting direction. (We may remember what Brewster points out in dealing with one of the illusions mentioned in his Natural Magic, that in many cases

it is the most observant eye that is affected by an illusion. In the present case the eye which has the best power of estimating breadths would be the one most affected by illusion as to the breadth of the space BF.)

Draw then the strip GH, Fig. 3, crossing the semicircle ABDF as shown. Here the curve CD seems to belong to a smaller circle than that of which it really forms part. It looks as though the curves AB, FE carried on beyond the strip GH would lie about considerably outside CD.

It will be found that if the parts CD, BE of the sides of the strip GH are erased, the illusion ceases.

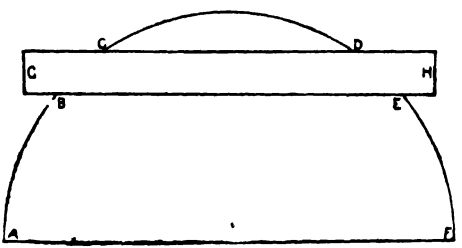


Fig. 3.

The erasure restores, as it were, the space GH to the level of the paper to which it really belongs.

The case illustrated in Fig. 1 is commonly regarded (but without sufficient reason, or, indeed, any assigned reason) as belonging to the class of illusions illustrated in Fig. 4 (first noticed by Zöllner). Here the lines AB, CD, EF, GH, &c., which are really parallel, appear to converge alternately towards AC, DF, EG,

HL, and KM. This illusion is different from that of Fig. 1, as affecting the apparent directions of lines, whilst the other does not. (Parallel lines are regarded by geometricians as in the same direction).

The illusion of Fig. 4 appears to result from the attention being drawn unduly to the circumstance that the vertical lines pass athwart the other sets at an angle, so that the angle is, as it were, exaggerated.

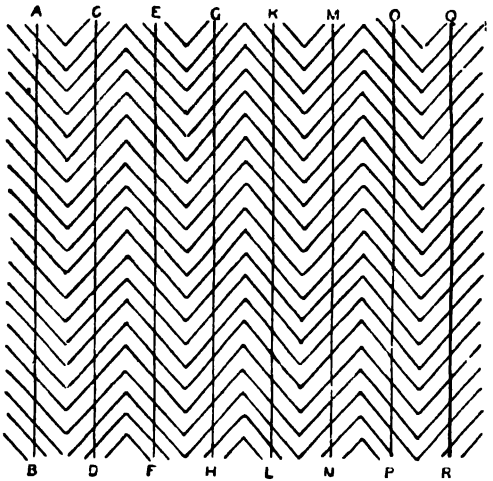


Fig. 4.

The eye notices, for instance, that AB passes the parallels in order from right to left, the uppermost parallel crossed by AB being farther to the right than the lowest, and thus the idea is conveyed that B,

instead of being a point vertically below A, is to the left of such a point. So D seems to the right of a point vertically below C, and so on.

The illusion of Fig. 4 admits of being varied and, in some cases, strengthened by substituting waving lines of various forms for the diagonal hatching. Several cases of this kind will be considered later.

The student should note next a few simple illusions, affecting not only the direction and position of lines really straight, but also their straightness, making them appear as curved lines.

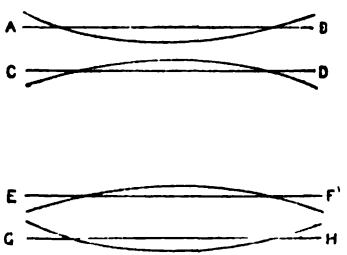


Fig. 5.

The lines AB, CD of Fig. 5 appear to be curved so as to be farther apart at the middle than at either end; while the lines EF, GH, in the same figure, appear to be so curved as to be nearer in the middle than at either end. Obviously, the eye unconsciously notes the varying distance between the really curved lines and the straight lines, and attributes part of the change of distance to a curvature of the really straight lines.

This form of illusion may be modified, as shown in Fig. 6. Some find the apparent curvature produced by the arrangement of Fig. 6 stronger than the other. For my own part, I find the apparent curvature of

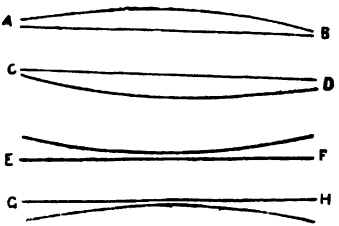


Fig. 6.

the lines AB, CD strongest in Fig. 5, that of the lines EF, GH strongest in Fig. 6.

The illusion seems intensified in the case of lines AB (Fig. 7), which seem to be convex towards each

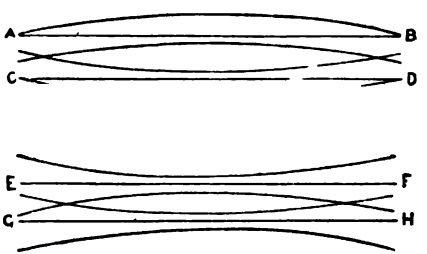


Fig. 7.

other; the symmetry of the pair of curves lying between these parallels ought theoretically to restore

the idea of parallelism. The lines EF and GH in the same figure may be made to seem either parallel or concave toward each other, according as the eye takes together the curves which approach EF and GH (respectively) nearest, or the concentric pairs; for the two curves which lie between EF and GH produce opposite effects on each of the lines EF, GH.

Such illusions as are illustrated in Figs. 1 to 7 vary in effect according to the position from which the illusory drawing is seen. Thus, if we so place Fig. 1 that the eye looks along, or nearly along, the direction AB, we see at once that CD is in the same straight line with AB. Again, although we cannot look simultaneously in the direction BC and ED in Fig 3, it will be found that when we look along BC, so that the illusion ceases so far as the part of the circle near C is concerned, the illusion ceases altogether, the part near D no longer appearing to form part of a smaller circle. In Fig. 4 the illusion is not at all effective when we hold the lines AB, CD, &c., upright, but is very marked when they are looked at aslant. But again, even when we look at them aslant, and the illusion is strong we yet find that running the eye backwards and forwards along the parallels, the illusion varies all the time; for the eye cannot fail then to perceive that the distance between the parallels does not vary as the illusory effect seems to suggest. Thus, the lines CD, EF, which, when the eye is at rest, seem to draw closer at D and F, are found not to do so when the eye is carried from CE to DF; and

a singular effect of motion is produced, the lines CD and EF seeming to move apart as the eye runs down them towards DF. The other lines seem to move correspondingly, and thus we have an illusion of motion, which will be considered later among illusions of that sort.

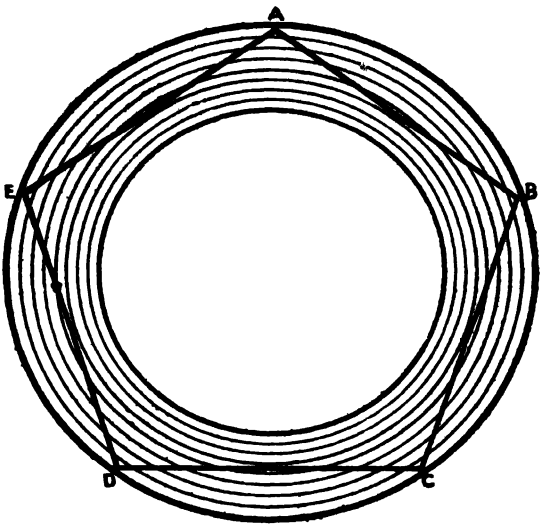


Fig. 8.

In the illusory figures now to be considered, the lines which appear curved, though straight, are set in different positions so as to be differently affected, and thus we have illusions affecting the shape of

enclosed figures, such as shall be considered separately further on.

If we look at Fig. 8 as it stands, that is, with the point A uppermost, we find the lines AB, AE looking strongly curved; BC and ED rather less curved; and DC looks almost straight—at least, this is the effect to my eye. (I find EA most curved of all.) Thus the figure, which is really a true pentagon with straight sides, looks like a figure having unequally curved sides. Turning the picture round in its own plane, we find that as the sides of the pentagon by this turning motion pass to the top, they appear more curved, so that they appear to change in shape as they move, or to have a motion of their own.

The apparent curvature of the really straight lines in Fig. 8 has been regarded by Mr. Proctor as having possibly some bearing on the irregular shape which the outline of the planet sometimes seems to have. It is referred to by Mr. Webb in his "Celestial Objects for Common Telescopes," who illustrates it, however, by a figure in which the distinctive characteristic is lost; the straight line in his figure does not cross the curved lines, and the suggestion of curvature, if it exists at all, is too slight to be readily recognised.

The effect of position on illusions of this sort can hardly, I think, be better illustrated than it is in Fig. 9, which may be described as "a nest of illusions."

Thus, First, the sides of the square ABCD, which are really straight, appear to be curved inwards.

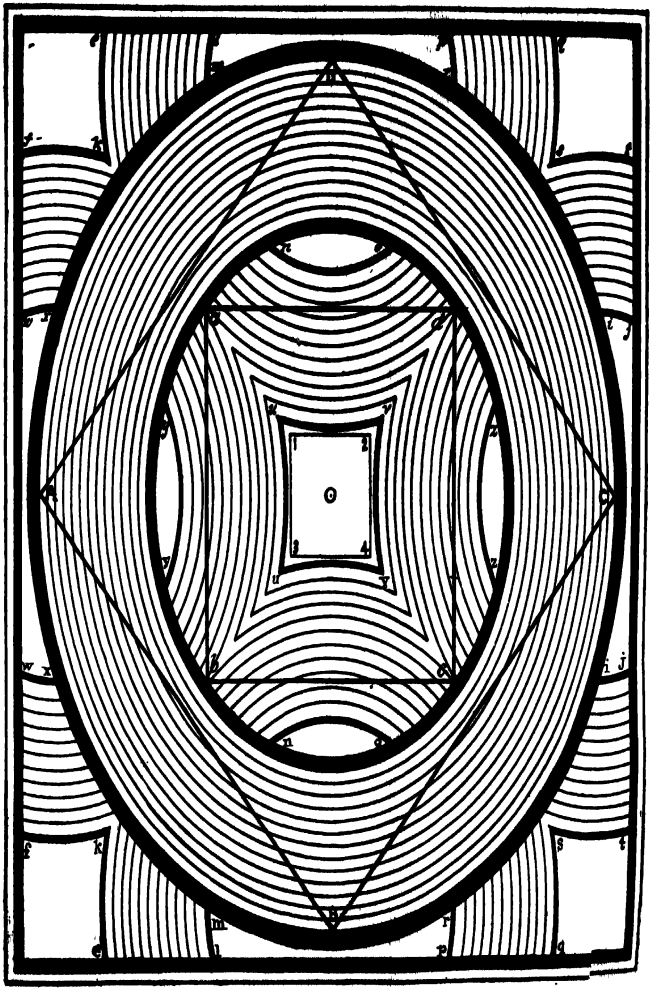


Fig. 9.—A NEST OF ILLUSIONS.

Secondly, the sides of the square *abcd*, which are really straight, appear to be curved outwards, as (in less degree) do the sides of the square 1 2 3 4.

Thirdly, the space between the two large heavy circles *mir* and *nzn*, appears to be superposed on the rest of the figure.

Fourthly, arc *no* (lighter curve) appears to belong to a smaller circle, instead of belonging, as it really does, to the same circle as the arcs *lm* and *pr*, the same holding with the other corresponding circular arcs of the figure.

Fifthly, it is difficult to realise that the space between the arcs *st* and *ij* is as broad as that between the arcs *vv* and *zz*, &c.

Sixthly, the circles between *no* and *zz* appear to draw closer together, though in reality concentric, as they approach the heavy circle *noz*, &c.

Seventhly, the same circles appear to draw further apart along the region 2*vd*, &c.

But it will be found that the illusion varies in amount for corresponding parts of the different portions of the figure; and that, as in the simpler case illustrated in Fig. 8, the different parts of the figure seem to vary in shape as the picture is turned round.

There is a series of illusions affecting the apparent shapes and positions of solid figures—not only regular geometrical figures, as prisms, parallelopipeds, &c., but all solids whatever—drawn as if formed of a transparent material, so that their farther as well as their nearer outlines or edges can be seen. It can be

readily shown that there is a law connecting in every case the false figure with the real figure. But illusions of this sort involve considerations somewhat more complex than those on which the simple illusions of direction and shape (of plane figures) thus far dealt with, and the illusions of motion presently to be considered, depend. They require a method of treatment which would not be very suitable to these pages.

In passing, I wish to submit to the reader an illusion which seems to me exceedingly instructive, as bearing on the question how we see. Everyone knows that the eye itself is simply the organ by which the optical nerve is affected by light, and that it is by this nerve that the brain becomes cognisant of such light effects, the brain interpreting the messages brought along the optical nerve into information respecting the objects brought into the field of vision.

Now the two eyes, and the optical nerves which extend to each, convey at all times different messages to the brain, which yet, as a rule, combines the two sets of messages into a consistent account (so to speak) of what is seen with both eyes. Even when the eyes differ in focal length, so that, as separately analysed, the views obtained by the two eyes are utterly unlike, the mind is very seldom perplexed by the two different accounts conveyed to it. But in the following experiment the eyes entirely deceive the mind, conveying to it the absurd impression that there is a hole right through the palm of the hand, or

of a book or other opaque object which may replace the hand in the experiment.

Roll a sheet of card or paper into a tube nine or ten inches long, and about an inch in diameter. Holding this tube with the right hand, say, look through it with the right eye, while the left hand is held six or seven inches from the eye, the palm facing you, and touching the tube a little below the lowest joint of the little finger, that is, at about the level of the middle of the palm. Then, if both eyes are open, the tube being held touching or close to the right eye, while the left eye looks at the left palm (at about the nearest distance for distinct vision), the appearance presented is as though there were a circular hole about an inch in diameter through the palm of the left hand.

Now, in this case, the mind does not need to be told that it is deceived. The observer knows as well as possible that while he seems to be looking with the left eye through the palm of the hand at objects beyond, he is in reality looking at those objects with the right eye through the tube. Yet the mind does not correct the illusion, clearly though it recognises that there is illusion and its nature. The illusion is as preposterous as that experienced when crossing the second finger over the first, we feel the tip of the nose with these fingers thus interchanged in relative position. In this case the observer seems to feel two nose tips, though he knows certainly that he has but one; he knows, too, just how the illusion is occasioned, but for all that the illusion remains.

The two most trustworthy senses, sight and feeling, being thus able to deceive—to palm off upon us, so to speak, what each of us knows to be false,—we see (and feel) how very far from the truth is the saying that seeing or feeling is believing. If these senses deceive us when we know precisely what they are doing (as when conjurors explain and illustrate in action the manner of their tricks), is it to be supposed that they do not often deceive us, and still more thoroughly when we have no means of testing what they tell us by what we already know?

Now, if the experiment be modified by using tinted, or strongly patterned paper for the tube, and by looking at variously coloured surfaces, it will be found that the strength of the illusion varies notably. (This may be tested by directing the mind's attention specially to the hand, so as gradually to overcome the absurd delusion by which one seems to look through the palm or the fist.) I leave this as an exercise to the student of illusions, noting that the result to which my own experiments have led me is this, that in ordinary vision what the left eye sees is referred by the mind (unconsciously, of course) to the right eye, and what the right eye sees is referred to the left eye. By a series of tests, such as those I have indicated, this peculiarity may be recognised. I believe the eyes might be trained to overcome illusions of this class.

And now let us turn to some illusions of apparent motion, which, like those we have already considered, can be explained if carefully studied.

I drew attention to the fact that the lines AB, CD, EF, &c., Fig. 10, which are in reality parallel, appear to converge towards AC, BD, CE, &c. I later called attention to the fact that this figure illustrates an illusion of motion. If the eye be run up and down the parallels, these appear to move. When the

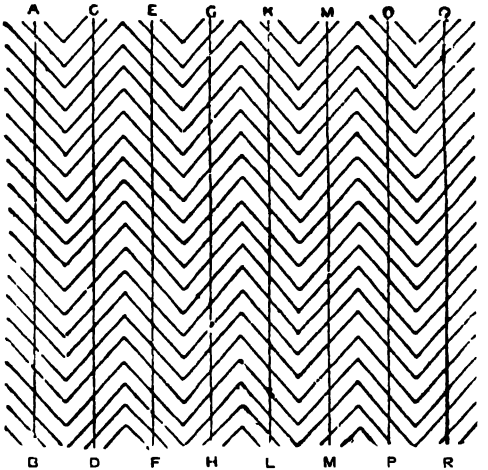


Fig. 10.—Illustrating Illusions of Direction, Shading, and Motion.

eye is at rest, they seem alternately convergent, especially if the figure is viewed a little askew, being neither held with the parallels vertical nor horizontal. But if the eye runs along two parallels which before had seemed to converge, they are found not to converge, and the effect produced is as though they had

moved from each other at the end towards which they had seemed to converge. Another effect, also, is noticed. The level surface on which are the zigzag sets of lines appears to be ridged, this being apparently due to the fact that the alternate sets of close parallels are viewed in different aspects. Thus, suppose the paper held so that B, Fig. 10, is lowest, then the parallels in sections CD, GH, MN, OR appear farther apart than those in the other, or alternate sections. Now, if the figure is rotated in its own plane, so that first HL, then R comes lowest, there is a change from the appearance just described to its reverse, the parallels in sections CD, GH, MN, OR, appearing now closer instead of farther apart than the others. Accompanying this change will be found certainly singular and rather complicated appearances of motion, the ridges sinking, then rising again, the sets of close parallels drawing apart or closer (and, if the motion is continued, closing up again, and drawing apart again respectively), and the other sets of parallels (vertical in the picture) seeming to bend and grow straight alternately.

Leaving the reader to study these changes and to note that they correspond with what we should anticipate, we proceed to more familiar instances of apparent motion, which find their explanation, I believe, in what we have learned from Fig. 10.[1]

[1] At the meeting of the British Association in 1877 (at Plymouth) Professor Sylvanus Thompson exhibited these singular illusions.

Consider Figs. 11 and 12, first at rest, and then as each appears when a slow circling movement is given to it (as when a saucer is so moved as to set a small quantity of liquid in it circling round near the edge), and then as each appears when swayed through a short distance from side to side, or from and towards you, in its own plane.

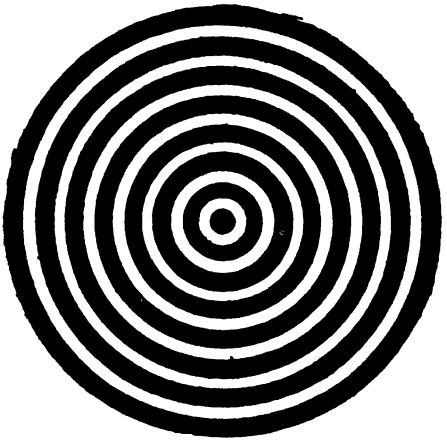


Fig. 11.

When looking at either picture, held perfectly at rest, the eye, if kept still, is presently affected by appearances of quivering motion, apparently affecting the entire picture. If the eye moves backwards and forwards across the picture, or irregularly over it, the sets of concentric circles appear to undergo partial rotations,—in alternate directions in one case, irregular-

in the other. When the pictures are made to circle in their own plane, all the sets of concentric circles seem to turn round in the direction of the circling motion given to the picture. Lastly, when the pictures are shifted back and forward in their own plane, from side to side, each set of concentric circles is blurred at the

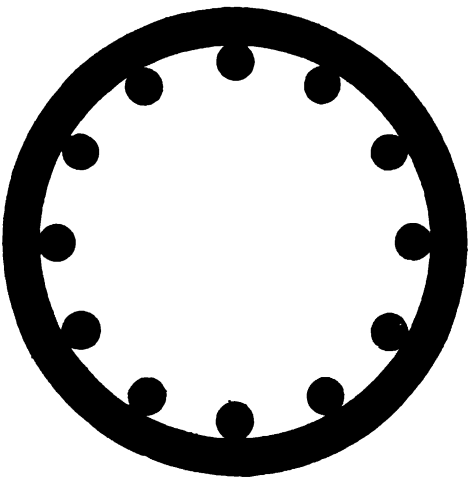


Fig. 13.

sides, or rather in the side quadrants, distinct in the upper and lower quadrants, regarding the sets as divided into quadrants by diameters situated thus ×. When the motion is from and towards the observer, the upper and lower quadrants of the sets of circles are blurred, the side quadrants distinct.

To produce the rotatory motion, it is necessary to give a tolerably rapid circling motion to either picture. The experiment succeeds better if the picture is mounted on card, and the circling motion is communicated by a suitable crank, so as to be more uniform than any motion which can be given with the hand.

When Fig. 13 is swayed like the others, by a circling motion in its own plane, the small black discs seem to be carried round in a direction contrary to that of the circling. It will be noticed that if the circle in which this figure is swayed is somewhat larger than is necessary to produce the deceptive appearance of motion, a regular pattern seems to be formed by the persistence of the visual images of the small black discs in the picture.

I append several additional cases of illusion which the publication of the preceding paper elicited from readers of *Knowledge*.

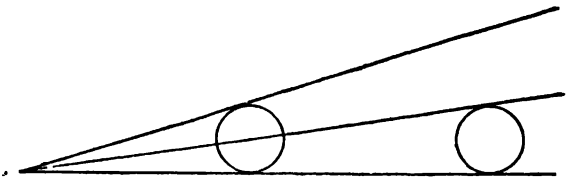
[1]—The following is an illusion which, I think, has not yet appeared:—

A *B* *C*

* * * * * * * *

The distance from *A* to *B* appears to be greater than that from *B* to *C*, although they are in reality both exactly equal.

F. W. G.



[2]—The above appears to me very striking, the circle on the left looking very much larger, though they are the same size. The illusion vanishes when a card is placed at the top of the circles.

F. H. S.

[3]—I enclose an instance of an optical illusion just observed. It will be noticed that Mr. Smith's address appears to decline to the left.

C. J. WATSON.

Mr. J. J. SMITH,
Blank Green,
SMITHBOROUGH,
Near BLANKTOWN.

[4]—Your first illusion I made an independent discovery of many years ago, as also, no doubt, have many more who have been much used to drawing geometric and mechanical patterns. Since the advent of *Knowledge*, however, I have thought a little more over it. The explanation of this figure is, I believe,

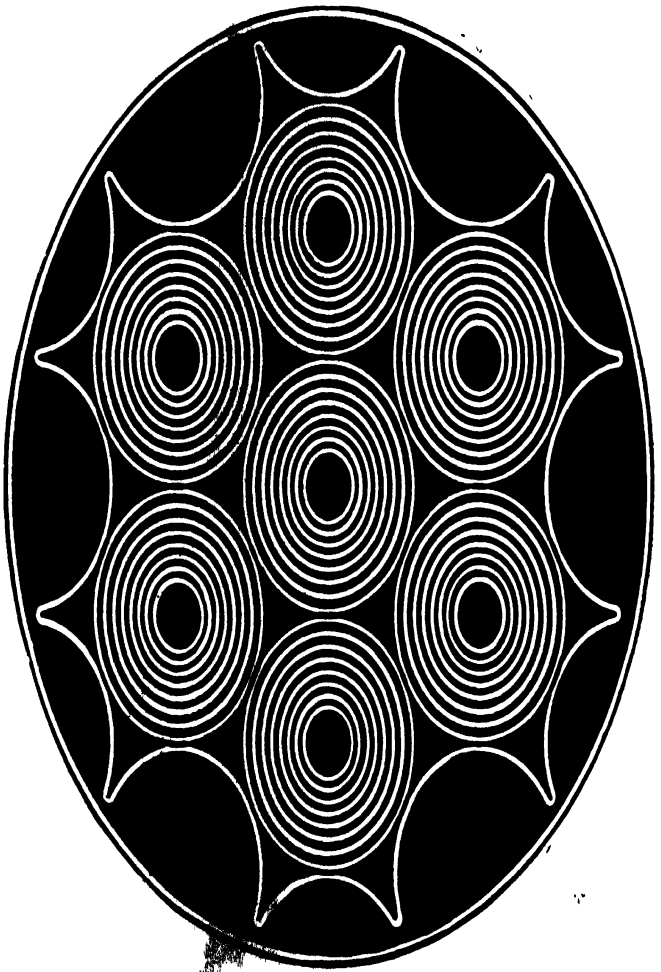


Fig. 8.—ILLUSTRATING ILLUSIONS OF MOTION.

to be found in the peculiar movements of the muscles of the eyeballs. The principal movements of the eyeball are vertical and horizontal. Vertical lines are followed by means of one pair of muscles, which move the eyeball through a vertical plane. Horizontal lines are followed by corresponding muscles. Oblique lines are followed by the eye through the combined action of both these pairs of muscles. It is true that there is also an oblique pair of muscles, but, from their position, I do not think they assist the eye to follow an oblique line, being more suited to rotate the eye upon the axis of its lenses. Referring, now, to diagram No. 1, the eye follows the line EG by a simple movement, but, in following the line AB, both pairs of muscles are employed. This movement, being more complex, is not so certainly continued when the guide of the line is lost by the interposition of the space EH. The eye is led away, as it were, also by the commencement at the point B of the line BG, which breaks the continuity of the oblique movement. It seems to me further complicated by the movement of two eyes, which work more easily together in the vertical and horizontal movements than in the oblique. This may be noticed when closing one eye, the illusion being then not so complete.

In confirmation of my remarks, I send you two diagrams. If the line EG be broken at B, the illusion is almost destroyed, the line having lost its power of attracting the eye to a simpler movement (Fig. *a*).

Again, if the same diagram be set before the eye

symmetrically disposed to the vertical position, so as to present to the eye similarly situated oblique lines, the illusion will vanish, as then the oblique movements of the eyes are required to follow both the parallel line *and* the one which is opposed to them. This, then, brings the diagram to the form of an ordinary Roman X (Fig. *b*) in which there is no difficulty in following the single line. If this same diagram be

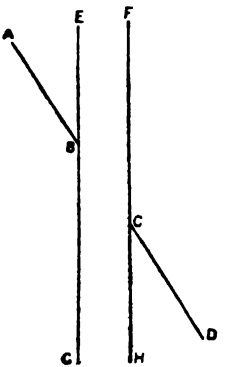


Fig. *a*.

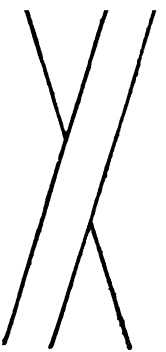


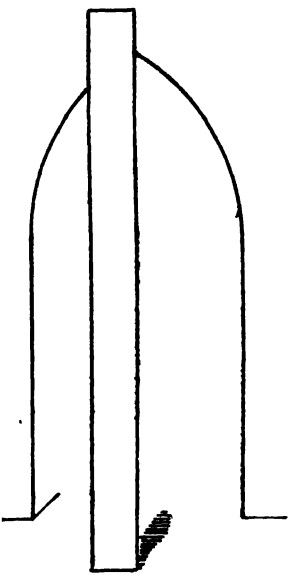
Fig. *b*.

set before the eye with the parallel lines either vertically or horizontally disposed, the illusion will reappear.

W. D. RICHMOND.

[5]—A singular and practical illustration of the optical illusion, illustrated in Fig. 2, came under

my notice a short time ago. The tower-arch of a church had been rebuilt, and during its construction a tall strut was set at an angle to the base, with its head fixed against the wall just above the apex of the arch. Whilst standing at the chancel steps, the arch presented a most singular appearance, and I called the contractor, who looked somewhat alarmed and astonished, and we both thought the arch must have dropped on one side. The accompanying drawing will explain what we saw. The pointed arch shows, better than the semicircle, the apparent illusion of the two lines belonging to different circles.

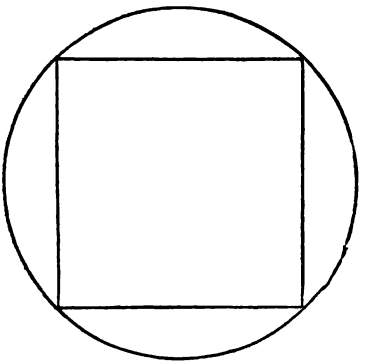


F. Long.

In order to make the illusion more plain, the strut is drawn out of proportion.

[6]—A few remarks upon the paper by Mr. Foster, on "Illusions," may be of some slight interest. The effects which angular, curved, and

straight lines, in juxtaposition, have upon one another, with respect to the eye, are certainly very curious, and few eyes will fail to perceive the apparent distortions in the cases figured. I should like to remark, however, that in Figure 5, to my eyes, and to those of the one or two persons to whom I have presented the figure, the effect of the curves on the straight lines is very marked, as stated by Mr. Foster.

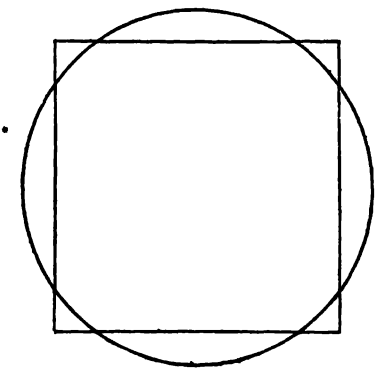


In Figure 6, to my eyes the straight lines AB and CD appear nearer in the middle, and EF and GH appear farther apart in the middle, thus agreeing with what is stated, and being the *reverse* of the two previous pairs of lines, which is what one would expect. I cannot by any method of gazing cause the straight lines in the last two pairs, Figure 7, to appear anything but parallel.

Above will be found a figure which shows the "flattened" appearance of a circle at the four corners

of an inscribed square—a distortion of the same nature as that shown in Figure 3, p. 84.

The figure beneath shows the same effect on the circle, and also gives the square the appearance of being drawn in at the middle of each side. Both these effects are shown much better with larger

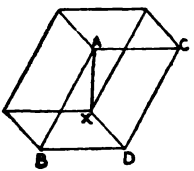


figures. All these diagrams form pregnant comments on the oft-repeated adage, "Cannot I believe my own eyes?"

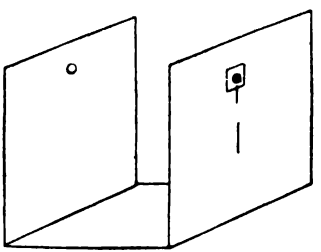
H. G., F.C.S.

[7]—Wheatstone calls attention to the following illusion, first mentioned by Professor Necker, of Geneva. The rhomboid AX is drawn so that the solid angle A should be seen the nearest to the spectator, and the solid angle X the farthest from him. But, in looking at the rhomboid, it will

occasionally so change that the solid angle X will appear the nearest, and the solid angle A the farthest away. Necker attributed the alteration of appearance, not to a mental operation, but to an involuntary change in the adjustment of the eye for obtaining distinct vision. Wheatstone, on the other hand, supposed the effect to depend entirely "on our mental contemplation of the figure intended to be represented, or of its converse."

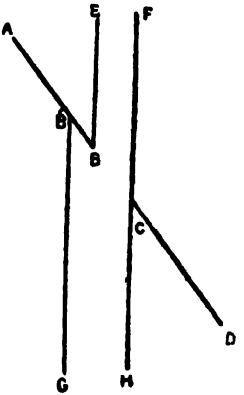


[8]—Take a strip of thin card, about three inches long and one wide, bend up the ends at right angles, perforate one end with a pin-hole and the other, directly and concentrically opposite, with a square hole about one-eighth of an inch square; place a small pin



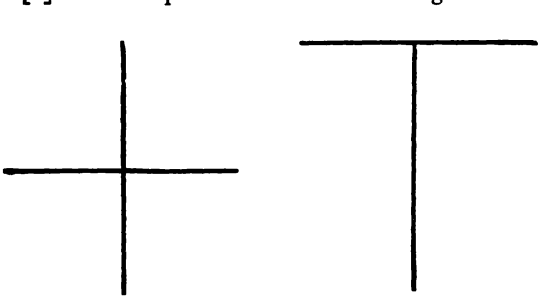
in this end, so that the head may be in the middle of the square hole; apply your eye to this end, and look through both holes towards the sky, and the pin will be seen apparently beyond the pin-hole and reversed in position. A. T. C.

Referring to Fig. 1, might I be allowed to suggest, as an explanation of the illusion, that the mind unconsciously grasps the impression of the vertical distance between EG and FH, to the exclusion or depreciation of the greater distance between B and C. I find that, if I construct the figure as here shown, making the distance of BG from FH equal to the diagonal distance BC, the illusion disappears.



WM. H. ALLEN.

[9]—A correspondent sends the following:-



How much longer is the perpendicular than the horizontal cross-bar?

THE LATER STONE AGE IN EUROPE.

In seeking to show the place of Palæolithic man in the order and succession of life upon the earth, it was necessary to ascertain the relative position in geological time of the deposits in which evidences of his presence occur.

But in treating of Neolithic man—man of that Newer Stone Age, the fundamental differences of which from the Older Stone Age have been referred to in a preceding paper—we best indicate his order in prehistoric time by reference to the advent into Europe of those earliest Aryan immigrants who confronted and commingled with the latest Neolithic peoples. Here no long or fitful breaks disturb the sequences of man's presence. With the Newer Stone Age begins the continuous history of civilization in Europe, for, although one race after another displaced or subdued its predecessors, advance in culture was only locally arrested, and was fostered by peaceful trading intercourse between east and west, between the barbarians of the north and the more advanced races of Central and Southern Europe.

It is about fifty years ago that Dr. Prichard, whose work on the *Physical Races of Mankind* did good service in its day, published an essay on the *Eastern Origin of the Keltic Nations*, pp. 40, 41. In this essay he

sketched the main features of the evidence then producible in support of the descent of these nations from a common ancestry, whose primitive home, although its site cannot be accurately determined, was probably on the wide plains spreading east of the Caspian Sea and north-west of Hindustan. That evidence, which has been enormously increased since Dr. Prichard's days, is, with rare exceptions, accepted by the leading authorities of our time as conclusive.

In an article contributed by Professor Max Müller to the *Oxford Essays* for 1856, and since republished in his *Chips from a German Workshop*, an admirable summary of the matter is given, as also a sketch of the state of civilization under which the ancestors of the now wide-spread Aryan or Indo-European races lived thousands of years ago.

Many readers of that brilliant paper will remember the surprise with which they learnt that, although a people may leave behind them no material remains, such as the famous empires of the East have left, there may survive indisputable evidence that they once lived. For it is not by means of relics in tombs or mounds, nor by aid of history stamped on tablets of baked clay, or cut on the face of rocks, nor by picture-words painted on the walls of temples now choked with the drifted sand of centuries, but by the help of language alone, that we can rebuild the villages and revivify the institutions of the old Aryan land. A careful analysis of words, and of the roots from which they spring, supplies proof that from the dialects

of these Aryan forefathers there have descended, varied by ascertained laws, the rich and vigorous languages in which the Vedas—most ancient of sacred scriptures—the Iliad, the Divina Commedia, the Gothic Bible of Ulphilas, and the plays of Shakespeare are written, and that the Aryans had obtained so advanced a state of civilization, that probably even with them the Stone Age, with its relics yet around them, was a pre-historic time.

The tribes, speaking their different dialects of a common tongue, appear to have consisted of two great branches, from one of which have descended the races that now people, with, of course, much admixture, nearly the whole of Europe, while from the other branch the Hindus and Persians, with some lesser peoples in Asia, have sprung. Among the earliest to swarm from the parent tribe were the Keltic tribes, who in their ever westward course, driven onward by succeeding emigrants, were finally pushed into north-western Europe, where they became for long centuries the dominant race. At this point there arises the question, who did they find here? Did the Kelt set his foot upon a virgin soil, or follow the track of earlier footprints of pre-Keltic races? and, if so, what can be learned about them? Here comparative philology, which has traced the Kelt from the plateaus of Central Asia to the mountain-fastnesses of Wales, fails us, and the pickaxe must be taken in hand.

Since the mass of material thus unearthed is enormous and perplexing, and as the purpose of this

sketch is only to point the direction in which the student of primitive culture should go, we will summarise the various places in which the remains occur, then the remains themselves, and finally the presumed features of the races which have bequeathed them—races possibly to be identified with peoples overlapping the more strictly historic period.

Neolithic implements are not found in deep-lying or sealed deposits, but either on the surface or among easily accessible remains. When the recollection of the Stone Age passed away, men looked with superstitious veneration on the unknown objects, often of delicate and exquisite shape, which they found on the surface of the soil, or turned up in ploughing and digging.[1] For ages it has been a widespread belief among the ignorant that with the flash of lightning there fell a solid body, which is called the thunderbolt or thunderstone, as expressed in the dirge in "Cymbeline":—

> Fear no more the lightning flash,
> Nor the all-dreaded thunderstone;

and it is these Neolithic relics to which such celestial origin has been assigned. They were known to the Greeks and Romans as thunderbolts; the natives of the Gold Coast, who find them lying on the ground, after heavy rains have washed away the film of upper soil, so regard them, using them as medicine by

[1] A large body of valuable information concerning these superstitions is given by M. Cartailhac in "L'Age de la Pierre dans les Souvenirs et les Superstitions populaires." (Paris: Reinwald.)

scraping the dust from them into water, and laying them in places sacred to the gods. In Brittany the travelling umbrella-mender inquires on his rounds for *pierres de tonnerre*, and takes them in payment for repairs. According to Pliny, the polished stone axes were used as charms against fire or shipwreck, and for insuring a successful lawsuit; they were the sweeteners of sleep, and added to the melody of song. In India they are valued as charms whose possession brings good luck to their owner, whose loss is the signal of his ill-fortune. Flint arrow-heads, called elf-darts by the country folk, have been found, mounted in bronze or in the precious metals, among Etruscan and other relics, evidently to be worn as talismans; and occasionally stone implements are discovered with mystic characters engraved upon them, as in the well-known case of the polished jade celt or *ceraunia*, inscribed with a Gnostic formula in Greek, preserved in the Christy Collection.

This, however, by the way. In addition to lying scattered in enormous numbers over the surface of the globe, Neolithic implements are found in kitchen-middens and coast-finds, in earth and stone monuments, and in lake dwellings. The coast-finds, or flint-finds, are collections of rudely-worked flints lying near the sea-shore in Denmark and the northern parts of this island, and corresponding exactly to similar heaps on the American coasts. Their rough character has led some antiquaries to assign them to the Palæolithic age, or, if Prof. Mantorani's suggestion be adopted, to

the "Miolithic Age," as denoting a period between the Older and Newer Stone Ages. The "kjökken-möddens," or kitchen-middens, once looked upon as natural formations, but now known to be the sites of ancient fishing settlements, are mounds sometimes one thousand feet in length, composed for the most part of myriads of castaway shells of oysters and other shell-fish, mingled with the bones of the stag, roe-deer, and other animals still extant, together with bones of birds and fishes. The most important of these shell-mounds, or refuse-heaps, lie along the Baltic shores; in some instances they are inland, witnessing to the receding of the sea since their accumulation. Further proof of their high antiquity is in the disappearance of the oyster from the Baltic waters, owing to their brackishness, except near the entrance, where, whenever a north-easterly wind blows, a strong current of salt ocean water is poured in. From this fact alone it may be inferred that there was formerly freer communication between the Baltic and the open sea, Jutland being, in the time of the Neolithic fishermen, an archipelago. Were further proof of antiquity needed, it is found in the flora of the country, for not only have oaks supplanted the pine, which then flourished, but they have themselves been supplanted by the beech.

The sites next in importance, and perhaps in order of time, are the monuments of earth and stone, which lend an air of impressiveness and mystery to the past, and which, little touched by the decay that has over-

taken the frail circular huts of logs and wattle in which their semi-barbarous builders lived, have preserved undisturbed the mute records by which men's "works do follow them." From time immemorial man has raised his pile of stones or mound of earth, in Gaelic *cairn* and Latin *tumulus*, both words meaning a "heap" or "swelling," or when marking the place of burial, called "barrow," from an Anglo-Saxon word meaning "to cover." In our own island, the smaller *tumuli* may be seen on almost every down; in the Orkneys alone it is estimated that more than two thousand still remain, and in Denmark they are even more abundant. They are found all over Europe, from the shores of the Atlantic to the Ural mountains; in Asia they are scattered over the great steppes from the borders of Russia to the Pacific Ocean, and from the plains of Siberia to those of Hindostan.[1] "The entire plain of Jellalabad," says Masson, "is literally covered with *tumuli* and mounds." In America the "animal" mounds, consisting of gigantic figures of men and brutes formed in low relief on the surface of the soil, mysterious alike in their origin and their purpose, are to be numbered by thousands. Nor are such structures absent from Africa, where the Pyramids themselves exhibit their grandest development; indeed, the whole world is studded with the burial-places of the dead and upreared memorials of persons and events, whether in rude monoliths, which here and

[1] Lubbock's "Pre-historic Times," p. 110.

there lift themselves on an outcrop of rock, or in elaborate monuments of the type which Artemisia raised over the ashes of Mausolus.

While the great tombs of the world most accurately define the Neolithic Age from the character of their remains, there is yet another class which, although overlapping a later time—indeed not far from the beginning of our own era—abound with Stone Age relics. I mean the sites of ancient dwellings on small islands, or on piles driven into the bed of lakes. This mode of life, obviously adopted as a protection against enemies and wild beasts by people disposed to peaceful settlement, has been observed by modern travellers in certain parts of Africa, South America, New Guinea, and elsewhere; and the earliest notice of such lake dwellings yet found is in Herodotus, who thus describes the dwellers on Lake Prasias in Thrace, the modern Lake Takinos:—"Platforms, supported upon tall piles, stand in the middle of the lake, and are approached from the land by a single narrow bridge. At the first the piles were fixed in their places by the whole body of the citizens, but since that time the custom which has prevailed about fixing them is this: They are brought from a hill called Orbelus, and every man drives in three for each wife that he marries. Now the men have all many wives apiece, and this is the way in which they live. Each has his own hut, wherein he dwells, upon one of the platforms, and each has also a trap-door, giving access to the lake beneath; and their wont is to tie their baby-children

by the foot with a string to save them from rolling into the water. They feed their horses and their other beasts upon fish, which abound in the lake to such a degree, that a man has only to open his trap-door and to let down a bucket by a rope into the water, and then to wait a very short time, when he draws it up quite full of them."

The earliest discovery of lake dwellings—"Keltische Pfahlbauten," or "habitations lacustres," as they are called—was made in 1839 by Sir Wm. R. Wilde in the small lake of Lagore, county Meath. Similar remains of "crannoges," as they are locally named, were found in many parts of Scotland; but they are surpassed in antiquity and importance by the numerous and extensive lake villages in Switzerland, of which between two and three hundred have been discovered. The dry winter of 1853–54 caused the lakes and rivers to fall very much below their usual level, and the inhabitants of Ober-Meilen, on the lake of Zurich, took advantage of this to reclaim some of the land, raising it with mud dredged from the neighbouring shallow water. In removing this mud, the workmen came upon a number of deeply-driven piles of oak, beech, fir, and birch, which had been observed before by fishermen, who thought that they were the remains of submerged forests. They found embedded in the mud around these piles heaps of primitive weapons, both of stone and bone, fragments of coarse pottery, pieces of charred wood; and closer examination satisfied Dr. Keller, whose *Lake Dwel-*

lings[1] is the standard work on the subject, that the piles had supported a platform, on which huts had been raised which were ultimately destroyed by fire.

Before describing the contents of these several classes of remains,—kitchen-middens, barrows, lake dwellings,—it should be said that the common feature which, apart from variety of form and material, distinguishes the tools and weapons of the Neolithic Age from those of the Palæolithic Age, is, that they are more or less ground to an edge and polished, witnessing to the advance of their makers in rendering stone more efficient for the increasingly complex uses to which it was put.

The most typical form is that known as the celt, from Latin *celtis*, a chisel. This instrument is usually a flat blade, approaching an oval in section, with the sides more or less straight, one end being broader and also sharper than the other. In length celts vary from about two to sixteen inches, and are made of various stones, according to the kind most accessible. A representative set of Neolithic implements would comprise the celts, stone tools allied to picks, small hand-chisels and gouges, perforated axes, some sharp at the end, others shaped like adzes, hammers and hammer-stones, grinding-stones, sink-stones for nets, whetstones, scrapers, borers, awls, drills, and knives. "On the whole," says Professor Teufelsdröckh, "man

[1] Cf. the second and greatly enlarged edition of this valuable work; two vols. (Longmans.)

is a tool-using animal. Weak in himself and of small stature, he stands on a basis at most, for the flattest-soled, of some half-square foot, insecurely enough; has to straddle out his legs, lest the very wind supplant him. Feeblest of bipeds! Three quintals are a crushing load for him; the steer of the meadow tosses him aloft like a waste rag. Nevertheless, he can use Tools; can devise Tools; with these the granite mountain melts into light dust before him; he kneads glowing iron, as if it were soft paste; seas are his smooth highway, winds and fire his unwearying steeds. Nowhere do you find him without Tools; without Tools he is nothing; with Tools he is all."[1]

Besides the implements named, there are those required for domestic purposes, while for war and the chase we find javelin-heads, sling-stones, arrow-heads, and bolts. Lance-heads of bone were also used, pins and needles of the same material, and bone hammers, axes, and hoes. The women's spindle-whorls were of stone, and their personal ornaments, the simplest form of which was the button or stud, were of jet, shale, and amber. In the kitchen-middens, besides the bones and shells already spoken of, no vegetable remains have been found, except burnt pieces of wood and some charred substance, thought to be a sea plant from which salt was procured. The flint implements generally resemble those of the coast-finds, as axes, bone pins, hammers, and sling-stones,

[1] "Sartor Resartus."

with, although rarely, fragments of coarse pottery. "In many places hearths were discovered, consisting of flat stones, arranged in such a manner as to form small platforms, and bearing all the marks of fire. The shells and bones not available for food gradually accumulated round the tents and huts, until they formed deposits, generally from three to five feet, but sometimes as much as ten feet in thickness, and in some cases more than three hundred yards in length, with a breadth of from one hundred to two hundred feet."[1]

In any reference to the stone monuments, as the circles or cromlechs, the table-shaped structures or dolmens, a host of unsettled and storm-charged questions as to their purpose confront us. Within a recent period, the Druidical theory was called in to settle everything. Now, whatever the Druidical religion may have been, its rites do not appear to have been performed within Stonehenge or Abury, or any other stone circles abounding from the Arctic regions to Australia. Having regard to "the presence, not to say the ascendency" of manes-worship in the religions of the world, from the lower culture upward to the higher, as in the disguised worship of the dead among Christians, it is most probable that both stone and earth circles mark the resting-place of the principal men of the tribe, deified into patron and guardian spirits. That veneration

[1] Lubbock's "Pre-historic Times," 2nd edition, p. 225.

and cultus of the dead which drew the survivors to the spot where he was buried, to offer him food and drink, made that spot the central place of common worship, and around it circles of standing stones and ramparts of earth were raised, as fences and rings were constructed around the dwelling of the living. Thus the transition from the tomb to the temple was effected, from the simple mound to the altar-stone and shrine over which the stately cathedral is upreared. *Tumuli* or cairns—whether of earth or stone, depended on the material in the neighbourhood—are either chambered or not. In the unchambered a hollow has been dug out, while the chambered are raised over a vault made of stone. In these recesses were placed the body or burnt remains of the dead, the mode of burial affording some clue to the relative antiquity of the barrow. Exceptions notwithstanding, it appears a general rule that bodies buried in a sitting or contracted posture belong to the Neolithic Age, the barrow lying east and west; so that the dead was placed facing the west, home of the setting sun, whither, in the myths of many races, the opening eyes would look and the body walk straight onward, to follow the soul to the land of the blest. Along with the dead, weapons and utensils were sometimes placed, presumably for service—knives or spear-heads, rude earthen jars with food or drink, from which relics, as from those scattered near the entrance, we have the sole data for judging what material advance man had made. So far as the caves (which, perchance,

were used for the humbler dead, and in which the condition of the living required them to dwell) and the long-shaped barrows supply these, we may infer that the earlier mound-builders had not passed beyond the stage in which they had to make shift with stone, bone, and horn for their tools and weapons. And it is in keeping with this that we find a people, to whom tree-felling with stone axes was anything but sportive labour, settling on the downs of Wiltshire or in the bare wolds of Yorkshire, to begin a pastoral life, varied by chase of the deer and the boar among the coarse brushwood and trees of the forest.

The lake dwellings are of very different dates. The mixture of stone and metal relics in the remains of many of them greatly complicates any attempt at arrangement, and affects the yet unsettled question whether the introducers of bronze into Europe were of another race, and whether the transition from stone to metal was sudden or gradual. But without making the blunder of forcing every class of objects into one of the three periods of Stone, Bronze, or Iron, there are sufficiently clear distinctions among the amphibious dwellers on the lakes to assign these remains, some to the Age of Stone, and others to that of Bronze. Buried in the soil with fragments of their huts, as wooden beams and clay-covered wattle-work, numberless articles of either stone or bone are found. Arrow-heads and lance-heads, fragments of rude nets and scooped-out trunks, show that they were hunters and fishers; the bones of sheep, swine, oxen, &c., and

stores of acorns, beech-nuts, &c., that they were shepherds; the rude hoes, the stock of cereals and preserved fruits, that they were husbandmen. Indeed, the grains found in these lake dwellings are of the kind still cultivated in Europe, and the domestic animals are still the servants of man; and it will be borne in mind that both our domestic animals and our cereals come from the East. That a kind of barter was already carried on, is shown by the presence of worked flints, which are not found nearer than France or Germany, and by coral and amber ornaments—the one a product of the Mediterranean, the other of the Baltic. In the oldest settlements the remains of the stag predominate over the ox, and the goat over the sheep, the wild boar over the domestic hog, the fox over the dog; whilst in settlements referred to the Bronze Age, the dog predominates over the fox, the domestic hog over the wild boar, and the sheep over the goat. At the Steinberg, identified as one of the later settlements, from a few weapons of iron met with there, numerous bones of the horse are found—an animal whose remains are extremely rare in the earlier series of dwellings.

In inquiring what can be learnt concerning the races whose relics have been thus cursorily summarised, it should be premised that speculation is limited to such as lived in Western Europe, because the Neolithic people in Eastern Europe have been so absorbed into or blotted out by subsequent immigrants that, as yet, nothing certain can be stated about them.

The lowest and earliest Neolithic races in Western Europe were those rude communities of fishers and hunters who accumulated the coast-finds and kitchen-middens. The bones of deep sea fish in the refuse heaps show that they had ventured on the ocean, perchance "the first that ever burst into that silent sea," in hollowed tree-trunks furnished with nets of twisted bark or bast, and other fibrous plants. That they had domesticated the dog, and were, therefore, in the later stage of hunter civilization, is ingeniously inferred by Professor Steenstrup, who, in trying to recombine the scattered bones of quadrupeds into complete skeletons, found that the parts missing were those which dogs were accustomed to eat, proving this by actual experiment. Although the low culture of these ancient coast-dwellers is inconsistent with the idea that they were the people who raised the magnificent *tumuli* of Scandinavia, as the mythical sepulchres of Odin, Thor, and Freyja, at Gamle Upsala, it seems impossible to doubt that they were racially connected with the builders of the chambered tombs, as also with the lake villagers of Savoy and Switzerland, because fragments of the polished celts, so characteristic a feature of the latter, are found in the kitchen-middens. No indications of arrested development meet us; rather does the succession of remains show a gradual mastery over nature, and increasing fertility of use of raw materials, the tribe advancing from the hunting to the pastoral and agricultural stage, a condition well attested by the Neolithic

remains in this island, which was the latest to become populated, since only peoples fairly advanced and fearless of the sea would venture to settle there.

Archæologists would seem to have laid hold of the hitherto missing links in a seemingly broken chain.

Up to a recent period which, as the Arabs speak of the time before Islam, we may call the days of "Ignorance," when Hebrew was said to be the most perfect of languages, and the mother of them all, when the Jews were believed to have sprung, like Pallas, from the forehead of Zeus, and ready equipped with inspired knowledge of the origin of all things, and with a pure monotheistic creed, no questions were raised concerning the culture which preceded them. The darkness of the nations around was as a divinely-planned background, whose contrast made brighter the witness of the chosen people to the unity and eternity of God. Now we know, that although

> No compound on this earthly ball,
> Is like another all in all,

they followed the same mode of development as every other race which has risen above the savage state; we have traced much of their culture and later religious beliefs to their historical sources, and uncovered the long-hidden birthplace of their civilization. Those who are busy in constructing the past out of the disentombed records of Assyrian culture and art, claim that sufficient evidence is producible to compel the belief that neither Aryans nor Semites, but some

third race, were earlier occupants and owners of the soil, and laid the foundation of the culture which was adopted and developed there by the other races, as they, one after another, succeeded to supremacy. Now, the people who laid the foundation on which Aryan and Semitic civilization more immediately stand, may be roughly classified with a family of wide geographical range, and using languages giving only slender evidences of kinship. We may connect these people, to whom the unmeaning name of Turanian has been given, with a widely-spread folk who, in pre-historic times, possessed a semi-civilization, and had distinguished itself by the raising of enormous grave-mounds and altar-stones. Its culture, doubtless, arose and was nurtured on the soil of Asia, thence spreading westward, and in the rude races of the kitchen-middens we may trace its rugged extreme, as in holes and corners of Northern and Western Europe we find non-Aryan survivors to this day. Similar modes of life do not necessarily imply connexion of race, any more than similar religious rites involve historical connexion; like needs involve resort to like methods of supply; yet with this caution against hasty theorizings, the points of resemblance and indications of direction of migration are such as lead some antiquarians to the conclusion, as already hinted, that the Eskimo are the lineal descendants of the Cave-men of the Ancient Stone Age. A like train of reasoning leads to the conclusion that the Finns and Lapps are the lineal descendants of the early

inhabitants of Europe in the Newer Stone Age. But these Finns and Lapps are *round*-headed folk, and we have yet another branch of non-Aryan, non-Semitic survivors in Europe, who are small-handed and *long*-headed. In the sepulchral caves of Wales, France, Belgium, Spain, and Gibraltar, skeletons occur of a small-limbed people, a comparison of whose skulls with those from Basque cemeteries identifies them with the dark-haired people of that name now living in the south of France and the north of Spain. Making every allowance for the external circumstances which create variety of cranial character among people of the same race, the evidence is sufficient to show that in the Neolithic Age a population indistinguishable from the Iberians extended over the region north of the Mediterranean, and to the east as far as the Rhine. In Wales we may recognise it in the small, swarthy descendants of the Silures; and in Ireland, in the dark Kelts west of the river Shannon, who are the offspring of Basque and Keltic intermixture. Thus the Basque element, both pure and mingled, in existing peoples scattered over Europe, is in direct connexion with the Neolithic Age, when non-Aryan races dominated Europe until they were driven westward by continuous Aryan immigrants, first among whom were the Kelts.[1] And

[1] The reader is referred to chapters vii. and ix. of Professor Boyd Dawkins' profoundly interesting work on "Early Man in Britain" (Macmillan), for fuller statements of the evidence adduced as identifying existing peoples with both Palæolithic and Neolithic man.

when it is remembered that Julius Cæsar found these last-named, as well as the Silurians, dwelling in Britain, we have reached a boundary where the historian proper takes up the broken story.

Our rapid survey of the Later Stone Age has carried us in directions converging towards a common centre. Like scattered fragments of ancient records which, unsuspected in their relations, compose, when combined, some continuous story, the several branches of scientific research, in which men engage without apparent concert, are found, when brought together, to stand in intimate, indeed, necessary connexion. And so far as the line of man's march can be seen from such survey, it runs with much zig-zagging, yet steadily, towards the West, thus confirming the ancient traditions that the earliest relics of his race are to be sought in the "storied East."

All evidence, so far, points to his rise in one locality. It is not likely that any one of the wide-lying oceanic islands was the site, for these last have, with few exceptions, been found uninhabited. That important body of testimony supplied by the geographical distribution of animals excludes, certainly, Australia —where the most primitive forms extant occur, and which is quite destitute of monkeys—and, with less certainty, the New World, from claim to be the birth-land of the race. Northern Asia was at a time, geologically recent, covered by the sea; Europe supplies no evidence of the highly organised ancestor of

man; and, so far as research has been made, the like applies to India.

The zone is, therefore, greatly narrowed, and it is satisfactory to know that the region yet left is that which appears to answer to many of the required conditions. There is some warrant for believing that a belt or fringe of land, which may be called Palæotropical, once stretched from the Sunda Islands along the southern coast-line of Asia to the eastern coast of Africa—perhaps westward beyond it, for the Malayan family is found in the isolated rock known as Easter Island, famous for its hundreds of ruined stone images. Of this continent, Madagascar, and smaller groups of islands in the Indian Ocean (Ceylon, &c.), would be the unsubmerged portions. Apart from the climatal suitableness of a warm region for the evolution of so slenderly organised a creature as man, it lies in the zone in which are found the most man-like apes. Moreover, such a region is required by ethnology, for we can then conceive that the inferior populations of Australia and India, the Papuans, and especially the negro race, which is not eminent for seamanship, would be enabled to reach their present abodes dryshod.

Such a speculation, and it is referred to only as such, may, although open to several objections, do service as a working hypothesis, and does not necessarily contravene the sound doctrine of the relative permanence of the great continents, and of the deep ocean basins from the earliest geological epochs.

In the freedom with which the races of mankind intercross; in the modifications of physical features induced by the various regions they inhabit, and the proof which these supply of their capacity to adapt themselves to the greatest contrasts of temperature; in the analogy of mode of intellectual, social, and religious progress, we have evidence pointing to the descent of the various races from one original stock. And in the similarity, not merely during the earlier stages of organic development, but in detail between the apparatus of the lower functions and of thought itself in man and the corresponding organs in brutes, the key-notes of unity are struck, man being "but the last term of a long series of forms, which lead by slow gradations from the highest mammal to the almost formless speck of living protoplasm which lies on the shadowy boundary between animal and vegetable life." Nor can we stop there. The organic is not separate from the inorganic in such a sense as that the passage from the one to the other can be bridged only by a distinct creative act. By steps none the less sure because dimly traced, we advance from the crystal to the cell, and refer the forces which lock the molecules of the one in angular embrace, and combine and animate those of the other, to the like ultimate source. No longer, therefore, do we restrict to physical phenomena the application of that doctrine of unity and continuity the denial of which is the only heresy from which we should desire deliverance.

ENGLISH OR BRITISH?

BY THOS. FOSTER.

Few doubts perplex the reader of most of our modern histories. He is told that certain events happened, certain races conquered or were overcome, that such and such laws were enacted and were administered, such and such customs prevailed or disappeared, and so forth. But he is not very often told how much doubt exists in reality about many of the matters thus dealt with. Very seldom is any distinction drawn between what is well known, what is probable, what is surmised, and what is barely possible. The evidence of historians is often quoted or referred to in support of statements, though even this is not always thought necessary; while evidence of an opposite kind is left unnoticed. Possibly this is the only method by which the generality of men can be persuaded to study history at all. But unquestionably it is not a philosophically sound plan. Nor indeed is it quite safe to assume that the more accurate method would deter readers. The historian, if he pleased, could present historic doubts as plainly and as attractively as historic certainties, or as historic untruths in the guise of certainties. He might borrow a lesson from the teachers of science. Formerly it was thought necessary in teaching science to the multitude to state as

facts many things about which science was in reality doubtful. The older books of science are indeed laughably dogmatic. But now, not only has it been found safe to distinguish matters doubtful from matters certain, but it has been found that the general student of science takes as much interest in the discussion of scientific doubts and difficulties as in the statement of scientific facts, or of mere guesses falsely presented as facts. And, after all, in that word "falsely" lies the gist of the whole matter. We are not to inquire whether it is more agreeable to the general reader to read history as Macaulay, Green, and others present it, than to have the opportunity of weighing historic evidence, but to consider if it is truthful and right to present what is doubtful as if it were well-established truth. Lord Melbourne used to say (I have seen the saying attributed to Sydney Smith) that he wished he were as cocksure of anything as Tom Macaulay was cocksure of everything. Possibly he did Macaulay justice in regarding him as really sure where he was so confident in tone. But to assume an air of cocksureness when really conscious of multiplied doubts and difficulties, is, to say the least, a mistake; and history will never be studied in the spirit which alone or chiefly makes its study valuable, until the teachers of history are content, when really doubtful, to use occasionally such expressions as "the balance of evidence favours the opinion," "it seems probable," "it may be suggested as possible," instead of leaving the reader to infer that the

records of long-past times are far more accurate and complete than those of the current era, respecting which, as we know, the best informed are often unable to agree.

The subject I am now to deal with illustrates well the confident manner of many modern historians, where the evidence is most incomplete, unsatisfactory, and even contradictory.

We used to be taught, indeed were never suffered to doubt, that when Vortigern invited Hengist and Horsa to help him against the Picts and Scots, the Britons had become a feeble cowardly race, insomuch that their Saxon allies, after accomplishing the work they were sent for, were soon able to dispossess their hosts, and drive them into Wales and Cornwall. Such a tale presented in an attractive form by Goldsmith, who wrote about history as charmingly and as carelessly as he wrote about natural history, was accepted as readily as were the amazing teachings about science in the school catechisms of pre-Broughamite times. But as science nowadays has become cautious and modest, and as even history in one aspect has become inquiring and critical, it might be expected that we should find the amazing statement of the older histories qualified considerably in modern treatises, even of the so-called popular kind. At any rate, if the complete dispossession of the British inhabitants of this country had become a demonstrated historic fact, one might expect that the nature of the evidence would be indicated, and the stupendous difficulties

involved in the matter so far discussed as to satisfy the thoughtful reader, without necessarily disgusting the general reader, who is supposed (quite mistakenly, in my opinion) to care only for the statement of facts, and to reject mere reasoning.

But what do we find in the popular histories of the day? The perfectly incredible story which has so long served as historic pabulum for the general reader, is presented with even more confidence, and in an even more astounding form, than by the popular historians of former generations. For instance, Green, in his really admirable "History of the English People," states the matter thus:—"With the victory of Deorham the conquest of the bulk of Britain was complete. Eastward of a line which may be roughly drawn from the moorlands of Northumbria and Yorkshire through Derbyshire and the Forest of Arden to the Lower Severn, and thence by Mendip to the sea, the island had passed into English hands. Britain had in the main become England. And within this new England a Teutonic society was settled on the wreck of Rome. So far as the conquest had yet gone, it had been complete. Not a Briton remained as subject or slave on English ground. Sullenly, inch by inch, the beaten men drew back from the land which their conquerors had won, and eastward of the border line which the English sword had drawn all was now purely English." In his Short History he had spoken with similar confidence, and almost as sweepingly:—"The conquest of Britain," he says, "was, indeed,

only partly wrought out after two centuries of bitter warfare. But .... at its close, Britain had become England, a land, that is, not of Britons but of Englishmen. It is possible[1] that a few of the vanquished people may have lingered as slaves round the homesteads of their English conquerors. . . . But doubtful exceptions, such as these, leave the main facts untouched. When the steady progress of English conquest was stayed for awhile by civil wars a century and a half after Aylesford, the Briton had disappeared from the greater part of the land which had been his own, and the tongue, the religion, the laws of his English conqueror reigned without a rival from Essex to the Severn, and from the British Channel to the Frith of Forth."

The recent account is in substance the same as Hume's :—" Thus was established, after a violent contest of near a hundred and fifty years, the Heptarchy, or seven Saxon kingdoms, in Britain; and the whole southern part of the island " (Hume means all south of the Frith of Forth), " except Wales and Cornwall, had totally changed its inhabitants, language, customs, and political institutions. The Britons, under the Roman dominion, had made such advances towards arts and civil manners, that they had built twenty-eight considerable cities within their province, besides a great number of villages and country seats. But

[1] In the larger work this passage is somewhat altered, but in such sort that even less seems admitted as possible

the fierce conquerors, by whom they were now subdued, threw everything back into ancient barbarity; and those few natives who were not either massacred or expelled their habitations, were reduced to the most abject slavery."

Before considering the nature of the evidence on which these sweeping statements are made, it will be well to point out the extreme antecedent improbability of the result thus presented both by recent and early historians, as if it were a perfectly natural result of the conquest of the Britons by the Saxons.

History presents many examples of the conquest of a race and of a country, by the fighting men of another race inhabiting another country. But no instance can be cited, save this of the conquest of Britain by Saxon warriors (if admitted), in which the conquest of a country was followed by the extermination or expulsion of its original inhabitants. The more barbarous the invading race, the less fully, doubtless, would they perceive the advantage of making their onslaughts only upon the fighting men of the hostile race, and upon these only when banded into armies. So that we could not expect that the barbarous Saxons would pursue the wise and prudent course followed by the Romans, who might thus, but for the abnormal development of imperial instincts, have maintained empire over a third of Europe for centuries after the time when Rome actually fell. The Saxons were barbarous and brutal, no doubt. They made few prisoners in their wars; they burned and

devastated places where they had been stubbornly resisted; and in fine, they neither went the wisest way to defeat their enemies, nor took the best advantage of their hardly-won victories. But we know nothing of them which would render it antecedently probable that, with all their barbarism, they were so brutally stupid as the historians I have cited, and many others, most confidently assume. Of course, if the weight of evidence should indicate that the Saxons really behaved so unwisely and so brutally as we are told they did, we must not reject the inference merely because it appears utterly amazing. Nor must we allow the unpleasant nature of the doctrine to dispose us against it. For, most unquestionably, Mr. Green's doctrine should be exceedingly distasteful to every Englishman who rightly apprehends its meaning. It not only presents the Anglo-Saxons (including in the name Angles, Saxons, and Jutes) as almost our only ancestors—since Danes and Normans would count for little—but it presents these ancestors of ours in a most uninviting, not to say an utterly disgusting, aspect. But, as I have said, we must not for such reasons reject the just inference from evidence. Yet we may fairly claim to look very closely into the evidence, and to insist that it shall be altogether satisfactory before we accept a conclusion at once so unlikely and so unpleasant.

Although Mr. Green is not at the pains to describe the nature and discuss the value of the evidence, he does seem to recognise the unusual character of

the results which he accepts so complacently. After showing how very different was the fate of Britain and that of the rest of the Roman world, he says that what really caused the difference, was the stubborn courage of the Britons themselves. "Instead of quartering themselves quietly, like their fellows abroad, on subjects who were glad to buy peace by obedience and tribute, the English had to make every inch of Britain their own by hard fighting." This resistance, too, was backed by serious natural obstacles. In the forest belts, which stretched over vast spaces of country, the English found barriers, "which in all cases checked their advance, and in some cases finally stopped it." "Field by field, town by town, forest by forest," he proceeds, "the land was won. And as each bit of ground was torn away by the stranger, the Briton sullenly withdrew from it, only to turn doggedly, and fight for the next." Green says nothing about their old men, their women, and their children. Where all else seems to have passed under his own eye, so confidently does he describe what happened, the manner in which the non-fighting part of the British people withdrew across the entire breadth of England, during the century and a half of fighting, is not described. He does not seem to consider that they were all slaughtered. "For the most part the Britons were not slaughtered; they were defeated, and drew back," taking therefore, we may assume, the weaker sort with them. But those who consider what the England of those days must have

been, will find it very difficult to understand how such a retreat of the British people could have been made before the victorious Saxons.

Gibbon gave due weight to the consideration dwelt on by Mr. Green. "Resistance," says the earlier historian, "if it cannot avert, must increase the miseries of conquest; and conquest has never appeared more destructive than in the hands of the Saxons, who hated the valour of their enemies, disdained the faith of treaties, and violated without remorse the most sacred objects of the Christian worship." And he proceeds to describe, in his own masterly manner, the terribly destructive nature of the Saxon inroad. But he by no means adopts the inference involved in the ordinarily accepted account. On the contrary, he says, "Neither reason nor facts can justify the unnatural supposition that the Saxons of Britain remained alone in the desert which they had subdued. After the sanguinary barbarians" (our only ancestors, if Mr. Green is right) "had secured their dominion, and gratified their revenge, it was their interest to preserve the peasants as well as the cattle of the unresisting country."

But now let us consider what evidence we have respecting the supposed extermination or expulsion of the former British inhabitants of this country. It may be that on inquiry the evidence will be found overwhelmingly strong. It should be, before reasonable men can accept it. Perhaps it is.

It appears, on tracing back the story to its source,

that the sole British evidence in favour of the extirpation of the British people is that of the monk Gildas. The English conquerors "left jottings," as Green says, "of their conquest of Kent, Sussex, and Wessex" in the annals which open the "Anglo-Saxon Chronicle," "annals undoubtedly historic, though with a slight mythical intermixture." Of the conquest of middle England we have no written account at all; and of the conquest of Northumbria no other account than the fragment bearing the name of Nennius.

Gildas, then, on whom so much depends, must, it should seem, be an historian of the most trustworthy sort, well acquainted with all that had taken place, either from direct observation or from communication with persons who had taken actual and leading parts in the events he describes. Mr. Green does not say much on these points. "The only extant British account," he says, "is the 'Epistola' of Gildas, a work written about A.D. 560. The style of Gildas is diffuse and inflated, but his book is of great value in the light it throws on the state of the island at that time, and as giving at its close what is probably the native" (that is, British) "story of the conquest of Kent."

It might possibly have impaired the feeling of confidence which some historians seem to think essential to the comfort of their readers, if Mr. Green had mentioned that we know nothing certainly about Gildas. It is not certain that he was a Briton, not certain that he lived in the sixth century, not certain

even that an historian named Gildas ever existed. That the treatise "De Excidio" is ancient is certain, because Bede refers to it; but what its actual age was, we do not know. (Bede completed his "Ecclesiastical History of the English Nation" in 731). The treatise itself is not held to be of great value by those best qualified to judge. It is a mere string of diatribes against the British priesthood, so bitter and so angrily worded, as to give some countenance to the theory urged by Mr. Thomas Wright, that the work is a fabrication by an Anglo-Saxon priest in the seventh century, and intended to serve as a weapon against the British priests, who at that time refused to admit, like the Saxons, the supremacy of the See of Rome. Gibbon characterises the author of the treatise as "a monk who, in his profound ignorance of human life, presumed to exercise the office of historian." Hume seems to have had such writings in his thoughts when he said, "the monks, who were the only annalists during these ages, lived remote from public affairs; considered the civil transactions as entirely subordinate to the ecclesiastical; and, besides partaking of the ignorance and barbarity which were then universal, were strongly infected with credulity, with the love of wonder, and with a propensity to imposture." Buckle speaks more generally—saying that the priests "have obscured the annals of every European people they converted, and have destroyed or corrupted the traditions of the Gauls, of the Welsh, of the Irish, of the Anglo-Saxons, of the Sclavonic

nations, of the Finns, and even of the Icelanders." If the opinion of Hume, Gibbon, and Buckle be regarded as likely to be unfair towards the monks, let it be noted that the Catholic historian Lingard, though he does not express a definitely unfavourable opinion respecting Gildas, rejects very definitely the opinion to which the treatise "De Excidio" has led less cautious historians. "The work of devastation," he says, "was checked by views of personal interest. The habitations of the Britons were wanted for the use of the conquerors; and the labours of the captives were found necessary for the cultivation of the soil. Hence it was that, as the Saxons extended their conquests, the buildings were suffered to stand, and the lives of the Britons who fell into their hands were spared, unless the thirst of vengeance had been excited by the obstinacy of their resistance. The captives were divided, together with the land, among the conquerors; they" (the captives) "became the property, the chattels, of their lord, subject to his caprice and transferable at his will. The same fate attended their descendants for many generations." Yet, if Gildas's record were trustworthy, we should have to believe with Hume, Green, and historians of what may be called the Goldsmith school, that so far as the English sword had reached in the seventh century, Britain had become England, a land not of Britons but of Englishmen, that the English conquest was "a sheer dispossession and slaughter," an absolute extirpation of the Britons.

But let us consider a little the internal evidence of Gildas's narrative, and inquire whether his account reads like that of of a credible witness. That is, let us consider his work apart from the inherent improbability of what he describes, and of the disproof resulting (as will hereafter be shown) from present observed facts.

Consider first his picture of Britain as a Roman province, from the time of its conquest, up to about the middle of the fifth century—that is, be it remembered, a full century at least before the time when the "De Excidio Britanniarum" was written. "The Romans," he says, "having slain many [Britons] and retained others as slaves, that the land might not be entirely reduced to desolation, left the island, destitute as it was of wine and oil, and returned to Italy leaving behind them taskmasters to scourge the shoulders of the natives, to reduce their necks to the yoke, to chastise the crafty race, not with warlike weapons, but with rods." Passing over the fact, for such it is, that this description is entirely inconsistent with the accounts of Roman writers, let us consider whether it is consistent with the only reasonable explanation of the supposed extirpation of the Britons. It appears, if we can believe this account, that before the Britons had experienced the full effect of the harsh discipline to which the Romans subjected them, they were content to yield when they found resistance of no avail. The crafty race became slaves, they yielded to the scourgings of their taskmasters, they submitted

their necks to the yoke. Yet we are told by those who accept the incredible account of their extirpation, that it was the indomitable courage of the race, their stubborn resistance to far more savage and cruel conquerors, that compelled the Saxons to exterminate or extirpate them. The two descriptions are utterly inconsistent with each other. If the Britons were the abject people described by Gildas in one part of his treatise, they never would have maintained the stubborn sullen contest which can alone explain their extirpation. In reality, neither one account nor the other is correct. The Britons fought bravely against the Romans, and had they fought unitedly, they would have defeated them. When conquered they submitted, much as the Saxons in after years submitted to the Normans. During the interval which elapsed before the Romans left Britain, the Britons lost in some degree the martial ardour for which they had before been conspicuous. But though they unwisely sought assistance against the Picts and Scots, they had by no means become altogether degenerate. Their contests with the Saxons, after these had shown their purpose, were marked by great courage and endurance, and occasionally showed (so far as can be judged by results) no contemptible conduct and warlike skill. That, in the prolonged contest which followed, the Britons should have shown greater stubbornness than in their contests with Rome seems unlikely, but is not wholly incredible. We may believe—it is at least possible—that the war-bands of the Britons preferred

death to submission, and that those who could, retreated gradually before the advancing Saxons to join their fellow-Britons in the west. But that the people who had yielded to the Romans acquired, during four centuries of submission, the stubborn courage and patience necessary for the deportation of the entire people from the country of their habitation to parts of Britain already inhabited by other British tribes, is utterly incredible. Much more incredible—in fact, altogether preposterous, when duly weighed—is the theory that such a contemptible race as Gildas describes could have effected so difficult an operation.

Note how utterly we should have to change our estimate of the ancient Britons if we regarded Gildas as a trustworthy narrator. Every one knows how bravely the Britons fought under Boadicea. History may have exaggerated her attributes in some degree; but it cannot have altogether erred, seeing that even her foes acknowledged the noble heroism, the stubborn courage, of the British Queen and her people. Scarce an eye but has been moistened at the thought of her wrongs and of her fate, not a heart but has warmed at her appeal to the Britons, when

> Far in the east, Boadicea, standing loftily charioted,
> Mad and maddening all that heard her, in her fierce volubility,
> Girt by half the tribes of Britain near the colony Camulodúne,[1]
> Brandishing in her hand a dart, and rolling glances, lioness-like,
> Yelled and shrieked between her daughters o'er a wild confederacy,

[1] Colchester.

Till her people all around the royal chariot, agitated,
Madly dashed their darts together, writhing barbarous lineaments,
Made the noise of frosty woodlands, when they shiver in January,
Roared as when the rolling breakers boom and blanch on the precipices,
Yelled as when the winds of winter tear an oak on a promontory.

We know how at first the gallant efforts of the Britons were successful, and for a while the Roman colony

felt the heart within her fall and flutter tremulously,
Then her pulses at the clamouring of her enemy fainted away,
Ran the land with Roman slaughter, multitudinous agonies.

The Britons were eventually vanquished, but even in their defeat they showed the warlike courage of their race. Eighty thousand of them, Tacitus says, were slain upon the field in the great battle which decided their fate. Yet they would again have tried the fortune of war, but that Boadicea, refusing to survive defeat, terminated her life by poison.

Now hear how Gildas speaks of this gallant people. They "made their backs shields against their vanquishers," he says, "presented their necks to the sword, and stretched out their hands to be bound like women, so that it became a proverb far and wide that the Britons are neither brave in war nor faithful in time of peace." As Dr. Nicholas (whose translation of Gildas I have followed here) most justly says, "a representation more mendacious was never put on record."

Let us hear again how Gildas speaks of the conduct

of the Britons in the face of other than Roman foes. After describing how the Romans sent forward, "like eagles in their flight, their unexpected bands of cavalry by land and mariners by sea, and planting their terrible swords on the shoulders of their enemies, mowed them down like leaves falling at the destined period," &c., he says of the Britons, "there was placed on the heights a garrison equally slow to fight and ill adapted to run away, a useless and panic-stricken company, who slumbered away days and nights on their unprofitable watch." Of all possible descriptions, it seems that none other could accord so ill with the Britons of Green's romantic narrative as Gildas's. Of all races of men, none could have been less fitted to accomplish what Green says the British people did accomplish, than a race "equally slow to fight and ill adapted to run away, a useless and panic-stricken company."

If Gildas was indeed a Briton, it is certain that he was an utterly base and contemptible Briton, thus to malign his own people. If he was not a Briton, he was doubly false.

I may pause here to call attention to a very interesting suggestion which has recently been made by Latham and Nicholas respecting a well-known passage in Gildas, on which, perhaps, more than on any other, the modern estimate of the condition of the Britons in the middle of the fifth century has been based. Gildas says that the Britons, "now a wretched remnant" (which is absurd, since he is speaking of

the year 447, before the long series of contests which began with the onslaught by the Saxons under Hengist), "pressed by the Picts and Scots, sent a letter to Aëtius, the Roman general in Gaul,[1] thus worded:—'To Aëtius, now Consul for the third time. The groans of the Britons. The barbarians drive us to the sea; the sea throws us back on to the barbarians: thus two modes of death await us,—we are either slain or drowned.'" This had always appeared to me a very strange story. Nothing in the circumstances of the invasion by the Picts and Scots corresponds to the picture of helplessness presented in this letter. Now, if the Picts and Scots had really been driving the Britons into the sea, would it have been a reasonable proceeding on the part of the Britons to appeal to Aëtius for help, in the year 447, when he was, as they knew well, too closely engaged in contest with the enemies of Rome in Gaul to send assistance to so remote a district as theirs? It might be added that, as Dr. Nicholas justly points out, the very form of the letter, "so rhetorical, sententious, and antithetic," casts doubt upon its authenticity, and that no people in urgent danger could write in language so affected. No doubt the actual wording of the request is as imaginary as the wording of the speeches in Thucydides. But although one might be led utterly to reject the story on this account, com-

[1] Dr. Nicholas strangely speaks of Aëtius as "a powerful Roman citizen," as if that were all which was known about a man of whom Gibbon said that his defeat of Attila had immortalised his fame.

bined with the objections before mentioned, yet it would on the whole be more natural to suppose that Gildas simply amplified after his wont a message which had really been sent to Aëtius—if only the story could be reconciled with probabilities.

This was the position of the question, when Zeuss, in his learned treatise, "Die Deutschen and die Nachbarstämme," called attention (but apparently without any thought about the narrative of Gildas) to a noteworthy passage in Constantius's Life of Germanus. "Presbyter Constantius," says Zeuss, "relates that as Bishop Germanus was returning home from Britain, where at the time the Saxons had made a descent, his intercession was besought by envoys from the Armoricans, against whom, on account of their defection, Aëtius had let loose the king of the Alani, that he might chastise them." Latham, reading this passage in Zeuss, communicated his impressions respecting it to Dr. Nicholas, who ably discusses the bearing of the statement of Constantius upon the account given by Gildas.

In the first place, let it be noted that Constantius (488) was a contemporary of St. Germanus, so that if the two stories really relate to one and the same event, that of Constantius is much worthier of credence than the other, written a century later, and by a writer of altogether doubtful authenticity. Now, the question whether the two stories do really relate to the same event, although it cannot be answered with absolute certainty, is one about which, in my opinion, very

little doubt can be entertained. Let it be remembered, first, that the Armorici, though they may not have been called Britons or Bretons in the time of Constantius, were certainly so called (generally Britons) when the story of Gildas was written. So that, since, by his own account, Gildas relied upon a report which reached him (in England) from across the sea (*transmarinâ relatione*), it is certain that the event related by Constantius of the Armoricans would be related to Gildas of the Britons. It would be as natural that, in an account by one dwelling on the Continent, the word should be used to identify the Britons of Gaul, as that Gildas should consider that it related to the Britons of England. An appeal was certainly made by the Gallic Britons to Aetius when Germanus returned to Gaul, which was in the year 447—the very year when Aëtius was "Consul for the third time." Moreover, these Britons, living in the corner of Gaul, with the sea on every side save that from which the Alani were attacking them, would have made just such an appeal to Aëtius as Gildas describes, only not in such carefully chosen terms. They could make it with some hope, seeing that in effect their appeal to him implied submission to Rome, and it was because of their revolt that Aëtius had set the Alani upon them. What is mere wordy nonsense as coming from the Britons of England (in 447, when the whole of Great Britain south of the Frith of Forth was open to them) reads as a very natural though wordy appeal from the

Britons of Gaul. Besides, we have not here to decide whether the Britons of Gaul or the Britons of England made the appeal. The Britons of Gaul certainly made an appeal to Aëtius in the year 447 to save them from the Alani; and as it was Aëtius himself, then governing the empire ["vir magnificus Aëtius," says Constantius, "qui tum rempublicam gubernabat"], who had brought the barbarians upon them, the Gallic Britons doubtless made an appeal almost as abject even as that described by Gildas. All we have to determine, then is, whether it is likely that in the same year, and about the same time, the Britons of England made a similar appeal to this same Aëtius, their appeal being worded in terms which did not correspond in the least with their own condition, and addressed to one from whom they had not the slightest reason to expect assistance, seeing that they had expelled the last remaining Roman forces thirty-eight years before. It seems so utterly improbable that such a coincidence should have occurred, even had the circumstances of the supposed British appeal been probable in themselves, that it would require very strong evidence to persuade us that the event really happened. But as a matter of fact the evidence we have is exceedingly weak.

A similar remark may be made respecting Gildas's narrative as a whole. His account is the only evidence we have (for the evidence of Nennius and Bede is based on his) for the extirpation of the Britons from the greater part of England. His evidence is dis-

credited in every possible way in which an historian's evidence can be discredited. Yet what he relates is so improbable it itself, that it could hardly be established by the combined evidence of several contemporary historians.

And now let us return to some facts which are tolerably well established. There are other kinds of evidence than stories related by monks, who lived long after the times about which they pretended to write, who passed their lives in the seclusion of the cloister, and who were familiar only with ecclesiastical matters.

The Saxons came over to England in the long open boats, called "chiules," or "cheols." The crews o three such ships (if so we can call them), cruising in the Channel under Hengist, were invited by Vortigern to assist him against the Picts and Scots. A few other chiules brought reinforcements to Hengist. Ælla and his three sons came over with a few more chiules. The squadron of Cerdic, the most powerful of all the first arrivals, consisted of five chiules. Ida came over in command of forty chiules. Probably, during the first century and a half of these Saxon invasions, as many as 500 such ships may have crossed the seas, each making several journeys; and possibly —but we have no trustworthy account of any such journeys—as many more may have been employed to bring over the wives and children of the Saxon warriors. How many ships were lost in such voyages it would be difficult to guess; but we must remember

that the North Sea and the British Channel were as stormy then as now, and that journeys in the chiules of the fifth and sixth centuries lasted longer and were somewhat more dangerous than the modern steamboat journeys across these seas. To the dangers of the sea, which must have been great, were added those which belonged to the piratical character of these expeditions. Small were the mercies the Saxon pirates might expect if their enemies had a chance of attacking them at advantage.

How many each chiule may have carried is uncertain. One of the old war-boats has been found in a Sleswick peat-bog. It measures seventy feet in length and eight or nine in width. Its sides are planks of oak, fastened together with iron bolts and ropes of bark. The arms, knives, axes, and lances of the warriors were found heaped together in the hold. Probably the warriors were no other than the oarsmen, though in later times, as we may see from the illustrated MSS. of the 12th and 13th centuries, the warriors occupied the middle of the boat, and the oarsmen belonged to an entirely inferior order. In the Sleswick chiule there are places for fifty oars, and fifty men with their arms and accoutrements would form a sufficiently heavy load for such a vessel; and we know that they would not too heavily load the ships, seeing that their strength, as well as their safety, depended as much on swiftness as on numbers.

It would be useless to attempt to obtain any exact idea of the number of such ships, or of the persons

brought over in them from the mainland to the shores of Great Britain. We may, however, be almost certain that the total number of persons so brought over did not exceed, probably it did not approach, half a million. A wild story is, indeed, narrated by Geoffroy of Monmouth, to the effect that 300,000 Saxons obeyed the summons of Hengist alone. But though Polydore Vergil, early in the 16th century, was considered almost insane for questioning the value of Geoffroy's "British History," and Aaron Thompson, in 1718, strove lustily to re-establish the waning credit of Geoffroy's work, no scholar of the least pretension to acumen regards it in our own day as of the slightest historical value. Bede, again, asserts that the solitude of the native country of the Angles attested in his day the entire emigration of their race: yet we hear at a later period of the existence of Angli and Warini in Germany. Moreover, it may be questioned whether the entire Anglian people in the fifth and sixth centuries numbered so many as half a million. Probably four-fifths of those who came over were fighting men, and the records of the battles between the Saxons and the Britons do not suggest the opinion that so many as 400,000, or even half that number of Saxon warriors, took part in the subjection of England at any one time.

On the other hand, there can be no question that the Britons formed a numerous population. They certainly far outnumbered at the outset all the Saxons who crossed the seas to England. The success of the

Saxons was not due to numbers, but to their superior conduct and discipline, their more concerted action, their greater fierceness in battle. That the Britons lost more men than the Saxons, and that they lost still more in mere numbers, because so many of the non-fighting population were slain, may be admitted, while yet it remains probable that relatively the loss of the Britons was seldom equal to that of the Saxons, and generally far inferior. If in a contest between 10,000 Saxons and 20,000 Britons, 1,000 Saxons were slain, and even so many as 10,000 British fighting men, and 40,000 or 50,000 old men, women, and children (after the fighting men had been beaten off), it would still not follow that the relative loss of the Britons (regarding the people as a whole) was greater than, or even equal to, that of the Saxons. For the British loss was a loss among a people to be counted by hundreds of thousands; the Saxon loss affected the entire Saxon forces at the time of the combat, numbering perhaps 40,000 or 50,000 at the utmost.

Granting the utmost amount of slaughter by the Saxons, the most energetic (we may as well say at once, the maddest) attempts on their part to drive out the surviving Britons of all ages and classes, we must yet believe (apart from definite evidence in favour of the belief) that the subject Britons largely outnumbered their Saxon masters even in those parts of England where the Saxons where most numerous and the Britons fewest.

When we examine such evidence as we have, we find this view strongly confirmed.

In the first place, it is stated in the seventh Triad that the Saxons compelled the Lloegrians to enter into confederacy with them, so that this tribe, originally one of the three honourable tribes of Britain, "became Saxons." The Brythons, also, seem to have joined the Saxons. Whatever historical value be assigned to the Triads, we can scarcely think that a statement such as that about the Lloegrians would have been made by Welsh historians, if no British tribe had joined their lot with the Saxons.

Next we note that even so late as 500 years after the time of Hengist, communities of Cymry remained in Wessex. From the will of King Alfred it appears that in the reign of Egbert, the counties of Dorset, Somerset, Wilts, and Devon were regarded as parts of the Weal-Cynne, the dominion of the Wealas, or "foreigners" (as the Saxons coolly denominated the ancient people of the country).

Again, as Dr. Nicholas well points out, the great battles fought at Bedford, Banbury, Petherton, Bath, &c., at epochs varying from a hundred to two hundred years after the landing of Hengist, attest the fact, that the Britons formed a numerous and active race outside of Wales and Cornwall. For these battles did not follow mere incursions of marauding bands from Wales or Cornwall: they were movements excited by the exactions of the Saxons.

Of the extent to which the Britons remained as

subjects of the Saxons, we have evidence far more satisfactory than any which has been advanced for the opposite and inherently most improbable theory that they either resisted to the death, or fled to Wales, Cornwall, and Brittany. I quote only a few illustrations, the salient points of the evidence, so to speak; but these will, I believe, be found sufficient, when the antecedent probability of the conclusion is taken into account, to establish the theory that a very numerous population of Britons remained in England after the Saxon conquest was completed.

In the "Saxon Chronicle" it is recorded that, in the year 571, Cuthulf fought against the *Bretwealas* (or British foreigners) at Bedcanford (Bedford), taking four towns, Lygeanbirg (Lenburg), Aegeles-birg (Aylesbury), Baenesington (Benson), and Egonesham (Eynsham). Then in 577, Cuthwine and Ceawlin fought against the Brettas (Britons), slew three kings, and took three cities, Gloucester, Cirencester, and Bath. Again, in 584, Ceawlin took "many towns and spoils innumerable." Now, as Dr. Nicholas points out, these were but a few of the many towns which the Britons held: "others they continued in undisturbed possession of, even for hundreds of years after the last of the above dates; but these they lost, with many others, only obscurely hinted at in history, when the seventh kingdom of the Saxons, Mercia, was established." Now, if we were told by the Saxon chroniclers, that when these cities were taken, every Briton, man, woman, and child, was slain,

not one slave being made, we should marvel utterly at the folly of the Saxons in thus robbing their conquests of their chief value. And we should wonder yet more, if we read that they drove out the survivors to take refuge in Wales or Cornwall. But we might in that case find the evidence so strong as to overcome the inherent improbability of the story, and compel us to believe what otherwise we should have deemed incredible. We find nothing of the sort however; no such horrors, outraging at once all humanity and all probability, are disclosed to us. We find that the Saxons conquered the Britons with a great slaughter, and took possession of their towns with spoils innumerable: but there is nothing to suggest that the conquerors so blindly marred their own fortunes, as Dr. Nicholas well says, "as to clear the fields of their cultivators, the towns of their merchants, the workshops of their mechanics, &c., possessing themselves merely of the empty shells of walled towns, and of desolated acres, which could neither pay tribute nor provision an army."

We begin to understand, then, why the Saxons became so powerful only a century later. "Some writers have asserted," says Burke, "that except those that took refuge in the mountains of Wales, and in Cornwall, or fled into Armorica, the British race was in a manner destroyed. What is extraordinary, we find England in a very tolerable state of population in less than two centuries after the first invasion of the Saxons. It is hard to imagine either the trans-

plantation, or the increase, of that single people, to have been in so short a time sufficient for the settlement of so great an extent of country." All difficulty is removed on this side, while at the same time the stupendous difficulty resulting from the inherent improbability of the accepted story is also removed, when we find from direct evidence that the British race was in no sense destroyed by its Saxon conquerors.

Observe again, how Bede, speaking of the most redoubtable of all the enemies of the Britons, describes the fate of the conquered. "At this time (A.D. 603), Ethelfrid, a most worthy king, and ambitious of glory, governed the kingdom of the Northumbrians, and ravaged the Britons more than all the great men of the English;" (this, be it noticed, is a quarter of a century after the victory of Deorham, 577, which, according to Mr. Green, made the conquest of the English part of Britain complete), "insomuch that he might be compared to Saul, once king of the Israelites, excepting only in this, that he was ignorant of the true religion; for he conquered more territories from the Britons, either making them tributary, or driving the inhabitants clean out and planting English in their places, than any other king or tribune." As even this "most worthy king," the most savage ravager of all the Saxon chiefs, only drove clean out those whom he could not make tributary,—and doubtless the brutal manner of his conquest made it harder for the Britons to yield to him than to the rest—we may well believe that other Saxon chiefs made the Britons tributary in even greater degree.

A few years later, the Britons, we learn from Ethel-

word's Chronicle, were fighting against the Saxons in the heart of Oxfordshire. "Afterwards Cynegils received the kingdom of the West Angles, and in conjunction with Cuichelin, he fought against the Britons at a place called Beaudune, and slew more than 2,040 of them." This battle took place 165 years after the settlement of Hengist in Kent, and 28 years after the victory of Deorham.

A little later we find a king of British name on the throne of Wessex. "All know," says Dr. Nicholas, "how in the north the great Welsh prince Cadwalla, or Cadwallader, in 634, defeated Edwin of Northumbria at Hadfield. In 685 a king of the same British name ruled in Wessex. He was probably a person of mixed extraction, but his name suggests a British relationship," to say the least.

In passing, I may remark that Mr. Kemble, in his fine work, the "History of the Anglo-Saxons," expresses the opinion that the title *Bretwalda* cannot be interpreted Ruler of the Britons, *Brit-wealda*, a derivation which he rejects as fanciful. His etymology, which Dr. Nicholas regards as more rational, is *bryten* wide, and *wealda* a ruler; a great, far-reaching king or governor. Why this etymology should be regarded as more rational than the other is not clear. It would be very difficult to cite instances in which a ruler those for his title a name implying the mere vague idea of extended rule. On the other hand, it would be altogether natural that the Saxons, proud of their conquest of the Britons and of their country, should select a title implying rule over Britain. The great dis-

tinction of the Saxon people in the sixth, seventh, and eighth centuries, was their overthrow of the Britons. What then could be more natural than that each Saxon king who for a time acquired superiority over his fellow-kings should arrogate to himself, or have accorded to him the title, Master of the Britons? This, indeed, would not be an interpretation which could for a moment be admitted by those who consider that there were no Britons, or very few Britons, left in England. But for one who holds, as Dr. Nicholas does, and in my opinion justly, that far the greater part of the population of England was British, after the Saxon conquest was completed, the interpretation should seem altogether rational. Etymologically, it is far more satisfactory. We have seen that in the "Saxon Chronicle" the British aliens were called *Bret-wealas;* a ruler over Britons would, in like manner, be called *Bret-wealda.* Whether it is possible that a far-reaching ruler might be called *Bret-wealda* because the Saxon for "wide" is *bryten,* I cannot venture to say; but certainly it seems unlikely enough in itself, and altogether improbable when the indefinite nature of the resulting title is considered. The Saxons were a people of whom it might almost be said, that of all races they most loved the definite, and least appreciated the abstract.

To return, however, to direct evidence,

According to Bede, Wilfred, the "Apostle of Sussex," received from his royal convert the gift of Selsey Bill, near Chichester, with the persons and

property of its inhabitants, then numbering eighty-seven families. He released them from bondage, and baptised 250 slaves of both sexes. At about the same time, Egfrid, king of Northumbria, made a grant of Cartmel, "with the Britons thereupon, to the See of Lindisfarne." It is probable that in one case, as in the other, the serfs made over so piously and summarily were Britons. Gibbon takes the same view of the former transaction, though the more significant second account seems to have escaped his notice. He proceeds to compute thence roughly the probable number of Britons in England towards the close of the seventh century. "The kingdom of Sussex," he says, "which spread from the sea to the Thames, contained seven thousand families; twelve hundred were ascribed to the Isle of Wight; and if we multiply this vague computation, it may seem probable that England was cultivated by a million of servants or *villeins*, who were attached to the estates of their arbitrary landlords. The indigent barbarians were often tempted to sell their children or themselves into perpetual and even foreign bondage." (It may, however, be questioned whether the so-called Saxon children publicly sold in the market-place of Rome were not mostly half-breeds, the children of British mothers.) "Yet," proceeds Gibbon, "the special exemptions which were granted to national" (*i.e.* Saxon) "slaves sufficiently declare that they were much less numerous than the strangers and captives who had lost their liberty or changed their masters by the

accidents of war. When time and religion had mitigated the fierce spirit of the Anglo-Saxons, the laws encouraged the frequent practice of manumission; and their subjects of Welsh or Cambrian extraction assume the respectable station of inferior free-men, possessed of lands, and entitled to the rights of civil society." It will be observed that there is no suggestion here of the complete depopulation quietly accepted by some historians.

Hallam, in his "History of the Middle Ages," although he does not adopt quite so definitely as Gibbon the opinion that there must have been a large British population, yet is very far from accepting unquestioningly the usual belief. "Beneath the ceorls in political estimation," he says, "were the conquered natives, or Britons. In a war so long and so obstinately maintained as that of the Britons against their invaders, it is natural to conclude that in a great part of the country the original inhabitants were almost extirpated, and that the remainder were reduced into servitude. This, till lately, has been the concurrent opinion of our antiquaries; and, with some qualification, I do not see why it should not still be received." He proceeds to state the evidence based on language. Our own language, he points out, is, and has been from the earliest times after the Saxon conquest, essentially Teutonic, and of the most obvious affinity to those Low-German dialects which are spoken along the coast from Flanders to Holstein. "With such as are extravagant enough to controvert

so evident a truth, it is idle to contend; and those who believe great part of our language to be borrowed from the Welsh, may doubtless infer that great part of our population is derived from the same source." Yet he shows that some Britons remained who were in a state of freedom, since a law provided that a Briton who held five hydes of land should be raised, like a ceorl, to the dignity of thane; though even these free Britons were valued at less, in assigning the composition for their lives, than the meanest Saxon freemen. Of the slaves, whose large numbers he recognises, Hallam says that they may be presumed, at least in early times, to be Britons. "For though his own crimes, or the tyranny of others, might possibly reduce a Saxon ceorl to this condition, it is inconceivable that the lowest of those who won England with their swords should, in the establishment of new kingdoms, have been left destitute of personal liberty." It should be added, as a point of great importance, that as the children of a female serf to a free father, or even to an unknown father, were by Saxon law free—not, as elsewhere, slaves—there must have been a tendency to rapid diminution in the number of slaves, relatively at least to the number of freemen.

With regard to the evidence derived from language, it appears to me that, while unmistakably the language has been Teutonic in form and substance, from the time of the Saxon conquest, we could not thence infer that the great bulk of the population was Saxon, at

the time when Green says all were Saxon. When a nation has been dispossessed by a conquering race, but large numbers of the conquered remain either in servitude or in subjection, there are for awhile two languages. Convenience so manifestly dictates the desirability of a single language, that usually one or other of the two disappears in the course of a few generations, or even in the course of a single generation. The question, which language will disappear, depends in part on the quality of the two languages, in part on the completeness of the conquest and the character of the conquering people. We can very well understand that the Teutonic languages would yield to the Latin of the Roman Empire: first, because of the superior qualities of this tongue and its association with literature; and secondly, because the Teutonic languages were many and diverse, the Latin (in those early days) one and wide-spread. But in Great Britain, where Latin had not dispossessed the British language, the Saxon language could hardly fail to become the dominant tongue, the Britons who remained in England being utterly vanquished. There was little, either in the quality of the British language, or in the position of the British people (in England itself), to give the British tongue a chance of becoming the language of ordinary intercourse. Many British words might remain in use, especially words relating to such occupations as the British serfs would be engaged in, or to the articles which they chiefly used. But they would have to pick up and

adopt as quickly as possible the language of their masters. It would be as reasonable to assert that there is no Negro blood in the present population of America, because no words of the African language are used in America, as to infer that the Britons were wholly exterminated because English has been the language of the country since the time of the Saxon conquest.

Thus the prevalence of the English tongue, even so early as the sixth century, proves in reality nothing respecting the relative population of Saxons and Britons in this English-speaking community. But for certain accidental relations which compelled the Angevin kings of this country to place their chief reliance on English armies, and to adopt a tone to Englishmen very different from that of the Norman conquerors, our language would probably have been far more French than English by this time, incomplete though the Norman conquest of the Saxons and Danes was, compared with the Saxon conquest of the Britons. I am well aware that our language never became very largely Normanised even in words, and that its structure underwent scarce any appreciable change.[1] But the opportunities for effecting a change were few, and lasted but a short time. Even the Norman kings were compelled to direct their atten-

[1] Yet we owe some characteristic peculiarities of our tongue to the French,—as, for instance, the loss of several forms of inflection which still remain in the Continental branches of the Teutonic language.

tion largely to France; and though in their time the English-speaking population was held in contempt, it was unsafe to attempt to dispossess the English language. From the time of John, matters changed so completely that, in the course of three generations, even the Norman nobles were proud to be called Englishmen. Yet even under these altered conditions, some in England feared, so late as the fourteenth century, that French would dispossess English in this country; and, indeed, some thought that the English language had already been greatly impaired. An Englishman, in 1385, wrote as follows on this point:—

"By commyxtion and mellynge first with Danes & afterwards with Normans, in meny the contry longage is apayred" (*corrupted*). "This apayrynge of the burth of the tunge is bycause of twoie things: oon is for children in scole agenst the usuage and maner of all other nations, beeth compelled for to leve hire own longage, and for to construe hir lessons and here thynges in French, and so they haveth sethe Normans come first into Engelond. Also gentlemen children beeth taught to speke Frensche from the tyme that they beeth roked in here cradel, and konneth speke and play with a childe's broche; and uplondissche men will lykne hymself to gentilmen, and fondeth with great besynesse for to speak Frensche to be told of."

But in truth, the best evidence respecting the relative numbers of Britons and Saxons is not that derived from the imperfect and often untrustworthy

records of the Saxon conquest, nor that from philological considerations. In these days, departments of science which were once scarcely thought to be connected in any way with history, throw important light on many historical questions of great interest and difficulty. We have learned to recognise in the complexion, figure, brain-conformation, and moral characteristics of a race, the qualities of their progenitors. We do not admit now the possibility that in so short a space of time as forty generations, for instance, a fair-haired people should become dark-haired; that a blue-eyed race should become dark-eyed; or that a race like the Saxons who followed Hengist, Ælla, and Cerdic, whether we consider their physical or their moral characteristics, should become such a race as we now recognise in this country. When we consider this form of evidence, we are compelled to reject utterly the belief that we are descended from a race either purely English (including Saxons, Angles, Jutes, and Danes), or in the main English. As Professor Huxley has said, though the Teutonic dialects have overpowered the pre-existing forms of speech, "the people are vastly less Teutonic than their language." To call the present inhabitants of Britain Anglo-Saxon is as absurd, he adds, "as the habit of talking of the French people as a Latin race, because they speak a language which is in the main derived from Latin." The psychological evidence points the same way as the ethnological. Many of the most important characteristics of Englishmen are derived

from Celtic ancestors. Some qualities of which Englishmen are proud, and others which they view, or ought to view, with less complacency, are derived from the ancient Britons; while correspondingly good or bad qualities of the race are derived from Saxon, Danish, or Norman forefathers. There is probably not a single Englishman, whose family has been long in the country, who has not an admixture at least of British blood with Saxon; while most of us have all four elements in our blood, British, Saxon, Danish, and Norman. (Of course there are many who, though called Englishmen, are of almost entirely foreign blood, and some who have no English blood whatever in their veins and show no trace of the English character in their habits of thought.)

But this part of my subject is too wide to be dealt with in the brief space now remaining available. It is well worth separate consideration. Not only is it full of interest, but it has an exceedingly important practical bearing. A nation can make no greater mistake than to misapprehend its own proclivities and capacities. We know what are the special aptitudes of Celtic races, and what are those of Teutonic races. Regarding ourselves, erroneously, as deriving our blood from one or other source, or incorrectly estimating the degree in which one or other strain affects the blood of the nation, or yet again, omitting to consider from what special orders of Celtic and of Saxon, Danish and Norman ancestors our blood has been derived, we should misapprehend our degree of fitness

for various forms of national enterprise. It may truly be said that we have, as a nation, repeatedly erred in this respect. In this way, then, as well as in others well worth considering, the study of our parentage as a race, from historical, archæological, philological, and physical evidence, possesses great practical value.

BRITISH AND AMERICAN ENGLISH.

BY RICHARD A. PROCTOR.

FEW of the subjects with which modern science has had, and still has, to deal, are more interesting than the inquiry into the changes which a language gradually and as it were unconsciously, undergoes, even among a people occupying one and the same region, and apparently exposed to few and slight changes from without. No one who considers the variety of dialect within our own country at the present time, or the evidence of continual change in the English tongue, from the time when it was first known as a written language, can fail to perceive that, apart from external influences (though, of course, such influences have not been wanting in England), a language is in a state of continual flux—in pronunciation, in the use and meaning of words, in manner of expression, idiom, and in various other respects.

The characteristics which distinguish the dialects of the northern from those of the midland and southern counties of England, or even the dialects of adjacent counties (as Lancashire and Yorkshire, Somersetshire and Devonshire, or Dorsetshire and Hampshire) from each other, were manifestly not the growth of a few years, but of centuries. The progress of our language from the earliest Anglo-Saxon days to our own time is of course recorded in the literature of the nation, which, carefully studied, reveals not only the more obvious influences of such causes as the Norman conquest and the sequent intercourse with France, but also the subtler changes which belong to the inherent growth of our language.

It is easy to perceive also how the spread of education has had its influence—and a very powerful influence—in checking changes which otherwise would have been rapid. We find, for instance, that in earlier times, books written in the English of the day, being read by few, had small influence in stereotyping, as it were, the use of words or phrases. But the writings of later times, and especially those of the sixteenth and seventeenth centuries (above all, the translation of the Bible in the reign of James I.), have had a most marked effect in preventing rapid changes in the language. The reason is obvious. Few read the earlier works, many read the later, and still more hear them read or quoted, and more still come into contact with those who have read them. So that the words and modes of expression in the later

works remain current from generation to generation, while many of those in the earlier works have become obsolete.

Yet it is to be noticed that even this influence, potent though it unquestionably has been, has not prevented change altogether. In fact, it is clear that with the lapse of time its power must diminish. In the eighteenth century, for instance — but still more in the latter half of the seventeenth century — modes of expression used in James's Bible and in the Book of Common Prayer (which, though older, may be regarded as belonging to the same era in our language) were still employed in ordinary life; and the fact that they were so often heard in church, chapel, and conventicle, helped to retain them in such usage. But when once an expression had fallen out of use—which would happen even in the case of some expressions once familiarly employed—Bible reading and the weekly use of prayers, collects, epistles, gospels, psalms, and so forth, could not restore it to general circulation. The number of words, modes of expression, idioms, &c., which have thus passed out of use necessarily increases with the lapse of time, and in time, of course, the book which had for a longer or shorter time prevented so many expressions from becoming obsolete, would become obsolete itself. A new translation would, in other words, become necessary—not, as in the case of the present revised translation, because of increased knowledge of the original, and

increased facilities for interproting it, but because the language of the Bible would have ceased to be the language of the people.[1]

It may be interesting to consider the various ways in which words, phrases, and expressions have fallen out of use since the time when the present English version of the Bible was prepared.

Some modes of expression seem to have died out without any very obvious cause. For instance, in the time of James I. the words "all to" were used where we now say "altogether." So completely has the former usage passed away, that most persons understand the words "and all to brake his scull" (when read aloud) as if they meant "and all to break his scull"; in reality, of course, the words mean "and utterly broke his scull." Other words and phrases have lost their original meaning in consequence of the growth (usually in literature) of another significance. For instance, as the word "comprehend" gradually approximated in meaning to the word "understand," with which it is now almost synonymous, its old usage, shown in the Bible expression "the darkness comprehended it not" (that is, the darkness did not enclose

[1] It appears to me a circumstance to be regretted, that those who have been at so much pains to revise the Bible should not have been bold enough to present their revised version in the English of our own time, instead of the old-fashioned English of the time of Elizabeth and James. This, perhaps, is the first occasion in the history of the Bible translation when men have expressed Bible teachings in a language such as they do not themselves speak.

and overmaster or absorb[1] the light), was gradually lost; at the present day, no one would think of using the word in its older and, in reality, more correct sense. In other cases, words have acquired a meaning almost opposite to that which they had when the Book of Common Prayer and the present English version of the Bible were prepared. Thus, we now use the word "prevent" as almost synonymous with "hinder"; but it is used in the opposite sense in the familiar prayer beginning "Prevent us, O Lord, in all our doings." So the word "let," which formerly corresponded very nearly with "hinder" or "prevent" (as at present used), now implies the reverse; so that there was nothing strange originally in the prayer that we might not be "let or hindered," though now the expression is certainly contradictory and perplexing (especially to the younger churchgoers). Some words and phrases, without having taken a new meaning, or even lost their old meaning, have fallen out of use in ordinary speech, or in prose writing, but are still freely used in poetry. Other phrases or usages have come to be regarded as ungrammatical—such, for instance, as the use of the word "often" for "frequent." ("Take a little wine for thy stomach's sake and thine often infirmities.")[2]

[1] *Con* intensative, and *prehendo* to grasp or seize.

[2] Compare Jaques' words,—"It is a melancholy of my own, compounded of many simples, extracted from many objects, and indeed the sundry contemplation of my travels, in which my often rumination wraps me in a most humourous sadness." In passing, note here the obsolete use of the words *sundry* and *humourous*.

As regards pronunciation, it would be difficult to follow and interpret all the changes which have taken place. Of some changes, indeed, we have no recorded evidence, while of others the evidence is but vague and doubtful. If the spelling, instead of being left free to individual fancy in former times, had been fixed as now, it would yet be (as it certainly is at present) no guide whatever to pronunciation. And in passing, it may be noticed that the advocates of a phonetic system of spelling might find a strong argument in the circumstance that such a system would enable the philologist of the future to trace the various changes which pronunciation will hereafter undergo: while had such a system been adopted in the past, we could form now a fair idea of the way in which our ancestors during different centuries of our past history spoke the English language of their day.

There are, however, some indications which afford tolerably sure evidence as to particular changes which the pronunciation of certain words has undergone.

For instance, remembering that many of our words have been derived directly from the French, but have been spelt, almost from their introduction, in an English manner, we can infer what was the ordinary sound-value of particular letters, singly or together. Thus, since the French words "raison" and "saison" are represented in English by the words "reason" and "season," we may infer that the diphthong "ea" originally represented the sound which it still represents in the word "great." For we can be tolerably sure that the change has been in the English, not in

the French, pronunciation of these words. There is no reason for supposing that in French the letters "ai" represent the sound ē, as do the letters "ea" in "reason" or "season." In fact, "ai" never could represent the sound ē. We infer then, that the change has been in the English, and that two or three centuries ago the words "reason" and "season" were pronounced "rayson" and "sayson," as they are still in Ireland (not, as is commonly supposed, because in Ireland the pronunciation has been corrupted, but because there the old-fashioned pronunciation has been retained). We find thus an explanation of certain words and passages in old writings that otherwise seem perplexing. For instance, Falstaff says in reply to the request of Hal and Poins for "a reason," "What, upon compulsion. . . . . Give you a reason on compulsion? if reasons were as plenty as blackberries I would give no man a reason on compulsion!" a meaningless rejoinder, at least, compared with the same answer when the word "reason" is pronounced like the word "raisin."[1] So the "nip-

[1] There are reasons for thinking that in many cases the letters "ee," as well as "ea," had the sound "ai" in Shakespeare's time. Thus the two lines—

> She was a wight if ever such wight were
> To suckle fools and chronicle small beer—

probably formed a rhyming couplet. So also, probably, the lines

> If we do meet again, we'll smile indeed;
> If not, 'tis true this parting was well made.

As the word "indeed" is pronounced "indade" in Ireland, there is reason for regarding it as belonging to the same category as saison, raison, mane, baste, tay, &c.

ping and eager air," spoken of in Hamlet, becomes intelligible only when the word "eager" is pronounced "aygre," and so becomes identical with the French "aigre," sharp or biting. If further evidence were required to show that formerly the letters "ea" represented the sound of "a" as in "fate," it would be found in the fact that in Pepys's Diary the word "skate" is spelled in one place "skeat," and in another "scate." It is clear, again, that the word "beast" was pronounced "bayst," though the play on the words "best" and "beast" in "Midsummer Night's Dream" (see the comments on Pyramus and Thisbe, as represented by Bottom, Quince, and Company) is not made much clearer by the change. Still, "bayst" is nearer in sound than "beast" to the word "best," even as now pronounced, and probably best was formerly pronounced with longer and more open "e" sound than now.

In passing, we may ask how the word "master" was originally pronounced, for this word was often spelt "mester," though oftener "maistre" and "maystre." Derived from the word "maître" (contracted from "maistre," as in the old French), we can have little if any doubt that the word was originally pronounced "mayster," which would as readily be corrupted in one direction into "mester" and "mister," as, in the other direction, into the modern pronunciation, "master" ("a" as in "father," not in "fat"). It is probable that the Scotch pronunciation of the word is much nearer to that prevalent in England three

centuries ago, and still nearer that prevalent in the time of Chaucer and Gower, than is our modern English pronunciation.

In a similar way other vowel sounds might be discussed, but this would take me too far from my subject—which, indeed, I have not yet reached. Before passing to it let me note, however, that consonantal as well as vowel sounds have undergone alteration in England during the last few centuries. We have evidence of this in the familiar passage in *Love's Labour's Lost*, where exception is taken by the pedant to the pronunciation "nebour" for "neighbour," "cauf" for "calf," and so forth, showing that formerly the letters "gh" in "neighbour" and other such words were sounded (probably gutturally, as in the Scottish "lough," &c.), and that the letter "l" was sounded in many words in which it is now silent.[1]

[1] There are good reasons for believing that the letter "r" was formerly pronounced much more fully than at present. Certainly our modern "r" could not properly be called the "dog's letter," as the nurse in *Romeo and Juliet* tells us it was called ("'r' is for the dog," &c.). We may thus explain the play on words in the passage where Celia ridicules the affected pronunciation of Monsieur Le Beau. "Fair princess," he says, "you have lost much good sport (not pronouncing the "r" rollingly, as was doubtless then the fashion, but "spo't"): to which Celia replies, "Spot! of what colour?" to the perplexity of Le Beau, as to that of many readers of Shakespeare. In passing, it may be noticed that many passages of Shakespeare are rendered obscure by changes of pronunciation. Thus, where Beatrice says: "the Count is neither sad nor sick, nor merry, nor well; but civil Count, civil as an orange and something of that jealous complexion," we are apt to overlook the play on the words "civil" and "seville."

It may be noticed, however, that "l" had become silent in some words in past times to which it has now been restored. For instance, most persons now pronounce the letter "l" in the name Ralph, probably because the name is oftener seen than heard; formerly this name was always pronounced Rafe or Rahf. So, it is clear from a well-known passage in the play of "Henry VI." (only in small part from Shakespeare's hand), that the name "Walter" was formerly pronounced "Water"—as, indeed, might almost have been inferred from its former abbreviation into Wat—for, if it had been pronounced Walter, the natural abbreviation would have been Wally or Wal'r (as Captain Cuttle called Walter Gay). The prophecy that the Earl of Suffolk would "die by water" would certainly not have been regarded as fulfilled when he was beheaded by the order of Captain Walter, if the name had not been pronounced "Water" in those times.[1]

[1] The passage runs thus :—

Suf. Look on my George, I am a gentleman;
Rate me at what thou wilt, thou shalt be paid.
Whit. And so am I; my name is Walter Whitmore.
How now; Why start'st thou? What, doth death affright?
Suf. Thy name affrights me, in whose sound is death.
A cunning man did calculate my birth,
And told me that by *water* I should die.
Yet let not this make thee be bloody minded;
Thy name is *Gualtier*, being rightly sounded.
Whit. *Gualtier* or *Walter*, which it is I care not, &c.

This reference to the sound of the word leaves no doubt that it was formerly pronounced *Water*. (So *Gualtier* is sounded Gautier, and has come to be spelt Gauthier.)

These considerations respecting the changes which our language has undergone—perhaps nowhere more than in the neighbourhood of the metropolis—have been suggested to my mind by certain remarks made

And here it may be asked whether the word "halter" was no formerly pronounced *hauter* (rhyming with *daughter*, *water*, &c.). For Lear's fool sings :—

A fox when one has caught her,
And such a daughter
Should sure to the slaughter,
If my cap could buy a halter,
So the fool follows after:

"after," probably pronounced as by the vulgar in our own time, *a'ter*. That "f" before "t" was silent in common speaking seems shown by *Wat* Whitmore's remark to Suffolk: "Come, Suffolk, I must waft thee (wa't thee) to thy death."

Nursery rhymes may perhaps seem an unlikely source of information respecting pronunciation, yet there are good reasons for believing that many old usages are preserved in those ancient rhymes. In particular, we may be sure that the rhyming, if not perfect, would be such as to appeal readily to the ear. Now, in Jack and Jill we find "after" rhymed to "water."

In passing, it may be noticed that in Shakespeare's time the "l" in "would" and "should" was probably sounded. For if "would" were then pronounced as in our time, "wou'd," we should scarcely find "wouldest" abbreviated into "woul't," as in

Woul't weep? woul't fight? woul't fast? woul't tear thyself?

Woul't drink up esil? eat a crocodile? &c.—*Hamlet*, Act v. s. 1.

In further illustration may be quoted the old lines on the vanity of human pride, inscribed on a gravestone by Melrose abbey, from which we learn that either the "l" was sounded in "would" or dropped in "gold":

The earth goeth on the earth glist'ring with gold;
The earth goes to the earth sooner than it wold, &c.

(Probably "gold" and "wold" were pronounced "goold" "woold.")

by an American writer—Mr. F. B. Wilkie, of the *Chicago Times*—respecting our English way of pronouncing the English language as compared with the American method, which he regards as on the whole more correct.

I must premise that Mr. Wilkie's work, "Sketches beyond the Sea," though it opens in a tone very unfavourable to the English people, shows considerable fairness, on the whole. English manners are not perhaps calculated to impress strangers favourably at a first view. It may not be generally true that, as Mr. Wilkie says, "one who visits a strange country encounters first its most repellent qualities,"—in fact, the contrary is sometimes the case; but this is certainly true of England and the English. Mr. Wilkie is justified in saying that his "fault-finding is confined to what may be termed the external character of the English," and in adding "that there is no partisanship in his views, because he has nowhere failed to denounce the weaknesses and follies of his own countrymen, whenever the opportunity to do so fairly presented itself." Of this the following humorous passage, which bears in some degree on the question of the American way of speaking English, may be cited in illustration:—

"If there be any particular thing which is calculated to make an American homesick, to make him feel he is indeed in a foreign clime, it is the entire absence of profanity."- (Would this were as true as it is complimentary!) "Except what I may have overheard in a few soliloquies, I have not heard an oath since my arrival in England. The cabman does not swear at you," (he does,

though, when he has a mind!) "nor the policeman, nor the railway *employé*, nor anybody else. Nobody in an ordinary conversation on the weather, or in asking after some one's location, or inquiring after another's health, employs from three to five oaths to every sentence. It's rather distressing to an American to get used to this state of things; to talk to a man for three or four minutes, and never hear a single 'd——n'; to wander all day through the populous streets and not hear a solitary curse; to go anywhere and everywhere, and not be stirred up once by so much as the weakest of blasphemics. What wonder that the average American becomes homesick under such a deprivation, and that he longs for the freedom and curses of his perrary home?"

Mr. Wilkie, finding that many words are pronounced otherwise in England than in America, and starting with the assumption that the American usage is correct where such differences exist, arrives at the conclusion that England "is rapidly losing its knowledge of English." "I have no less an authority than Earl Manville," he says "for the statement that educated Americans speak the English language far better than educated Englishmen." I have yet to learn that Earl Manville is a very high authority on this particular question, whether from his exceptional knowledge of the English language, or from the opportunities he has had of comparing the way in which that language is spoken in England and in America. Not for the present considering pronunciation, and taking the English of those who are recognised as the best writers in that language as the best, it is, I believe, incontestable that on the whole a thoroughly educated Englishman speaks the language more correctly than even the best educated Americans;

only it is to be noticed under what reservation I make this assertion. There are usages which have become recognised in America, and are adopted by the best American writers, and which are thus correct *in that country*, though not in accordance with the rules which —tacitly or otherwise—English writers follow. They are correct in this sense, that they are in accordance with general custom, "quem penes arbitrium est, et jus et norma loquendi." And although it may be admitted that some few of these usages belong in reality to the English of two or three centuries ago, it cannot be denied that many, if not most of them, are recent. I am here speaking of the form and construction of the language, not of pronunciation. As to this, it must be admitted that there is room for doubt respecting many of those points in which the two countries differ. As regards a few doubtful words, it would be scarcely worth while to inquire, there but are whole classes of words which are differently pronounced in the two countries, and it is in many cases doubtful whether the older (which may be considered the true pronunciation) has been retained in the old country or in the new.

"I have no doubt whatever," says Mr. Wilkie, "that were a wall built between England and America, so that there could be no intercourse, in two or three hundred years a native of one country could not understand a word spoken by the other." Setting aside the manifest exaggeration here, and supposing for a moment that, contrary to all experience, so short a time as three centuries would suffice to render the English of America unintelligible to the people of

England, and the English of England unintelligible to the people of America, it would be altogether absurd to infer, with Mr. Wilkie, that "this would be because England is rapidly losing its knowledge of English." Nor is there the least reason for supposing, as Mr. Wilkie does, that it is because "England has no dictionary, or, what amounts to the same thing, has a dozen," that the language undergoes continual change. No dictionary, however excellent, can stereotype a language, either as to the usage of words or their pronunciation.[1] In America changes are taking place at least as fast as in England, probably faster. Mr. Wilkie found, he says (though one wonders where he can have obtained such experience), that there are in England about as many standards of pronunciation as there are people who have anything to say. He is referring all the time, be it understood, to educated Englishmen. Yet he can point only to a few words, most of which are seldom used; whereas any Englishman who has travelled much in America could cite dozens of words, all in ordinary use, which are diversely pronounced there by educated persons. Thus I have heard the word "inquiry" pronounced "ínquĭry," "quandary" pronounced "quándăry," "vagary" "vágărry,"[2] "to-

[1] If Mr. Wilkie had been at the pains to look over the introductory matter in "Webster's Dictionary," he would have found that in quite a number of cases where he—Mr. Wilkie—finds fault with English pronunciation, Webster is against him.

[2] We see here the effects of the tendency in English speaking to throw back the accent. In England we have "cóntrary" now instead of "contrăry" as in Shakespeare's time: compare also the nursery rhyme "Mary, Mary, quite contrăry."

wards" and "afterwards" pronounced with the stress on the last syllable, "very" and "American" pronounced "vury" and "Amurican" (u as in "furry"), and so forth, by educated Americans; while other educated Americans pronounce these words as they are usually pronounced in England. "Gladstone says *issoo*," remarks Mr. Wilkie, "when other intelligent men say *isshu*." He might have added that Lord John Russell used to say "obleeged," as many old folks do still, and that the question was once raised in the House of Lords whether the word "wrapt" should be pronounced to rhyme with "apt" or with "propt." As a matter of fact, however, Mr. Gladstone does not say "issoo," but "issyou," which is probably correct; at any rate, as much can be said in its favour as in favour of "ishyou." Of course "issoo" and "isshu," the two pronunciations given by Mr. Wilkie, are both as utterly wrong as "Toosday" or "Dook," modes of pronunciation, by the way, which are very commonly heard in America.

As the point is considered next by Mr. Wilkie, though not next in logical sequence, I may consider here his reference to the pronunciation of certain proper names in England which are spelled (and he considers should be pronounced) very differently. Of words of this kind he cites:—

"Colquhoun—pronounced Calhoun—(really pronounced Cohoon); Cockburn, pronounced Coburn; Beauchamp, pronounced Beechem; Derby, Darby; Berkley, Barkley; Hertford, Hefford (where can he

have heard this? Hartford, of course, is the accepted pronunciation); Cholmondeley, Chumley; Bouverie, Booberie (an unknown version); Greenwich, Grinnidge; Woolwich, Woolidge; Harwich, Harridge; Ludgate, Luggat (by cabmen, possibly); High Holborn, Eye Oburn (cabmen, certainly); Whitechapel, Witchipel (never); Mile End, Meelen (possibly by a Scotch cabman); Gloucester, Gloster; Leicester, Lester; Pall Mall, Pell Mell."

He might have added "Marjoribanks, Marchbanks; Cavendish, Candish; Salisbury, Salsbury," and a host of other names. But he mistakes greatly in supposing (as he appears to do) that these divergences between pronunciation and spelling have had their origin since America began—whether we regard America as beginning in the days of the Pilgrim Fathers, or of the war of Independence. Some of them are at least five hundred years older than the States. But without expecting from every visitor the antiquarian knowledge necessary to establish the antiquity of the older of these modes of pronunciation, we might fairly expect that a literary man should be acquainted with the fact, that Shakespeare knew no trisyllabic Gloucester or Salisbury, that with him Warwick was Warrik, Abergavenny Abergany, and so forth.

If aught of blame is deserved for the continued use of old forms of spelling when the old modes of pronunciation have passed away, or for any divergence (no matter how caused) between pronunciation and

spelling, we may meet the American with a *tu quoque* we may say to him—

Mutato nomine, de te
Fabula narratur;

for, either within the brief duration of our cousins' own history the pronunciation of many proper names has diverged from their spelling, or else those names were originally most incorrectly spelled. How otherwise does it happen that the trueborn American speaks of Connetticut instead of Connecticut, of Cincinnatah instead of Cincinnati, of Mishigan, Mizzouri (in the South and West, Missouri is called Mizzoorah), Sheecahgo, Arkansaw, Terryhote, and Movey Star, instead of Michigan, Missouri, Chicago, Arkansas, Terrehaute, and Mauvaises Terres (pronouncing the last two words as French)?

Taking other than proper names, Mr. Wilkie seems scarcely to have caught in many cases the true English pronunciation. For instance, one of the most marked differences between English pronunciation and that with which Mr. Wilkie would have become familiar at Chicago, is found in the sound of the vowel "a" in such words as "bath," "path," "class," &c. Now, although he mentions in one place that the "a" in the word "classes" is pronounced like the "a" in "father," (which is right), he adds, even there, that the sound of the word is almost like "closses," which is altogether wrong; while elsewhere he says that the "a" is pronounced like the "a" in "all," or as "aw." He gives "nawsty" as the English pronunciation of the word "nasty." He says, "an Englishman must

inform some of his acquaintances during each day something about his bath, the "a" being sounded like "a" in *all*." Of course, no educated Englishman ever pronounces the "a" in "bath," "path," &c. like the "a" in "all"; nor indeed have I ever heard an uneducated Englishman so speak, though it is likely enough there may be dialects having this pronunciation. In fact, the story of the clergyman who, when asked whether he would be bishop of Bath or of Wells, answered "Bawth, my Lord," and so became the first Bishop of Bath and Wells, whether true or false as a story, serves to show that the word is sometimes pronounced "bawth." But certainly this is not the usual way of pronouncing it in this country. To American or rather to Western ears, there must, it should seem, be some resemblance between the sound of "a" in "class," "path," &c., as Englishmen pronounce the vowel, and the sound of the vowel "o"; for I remember that when once in Illinois I asked where the "office clerk" was, the office *clock* was shown to me. It is, by the way, somewhat difficult to understand how the "e" in the words clerk, Derby, Hertford, &c., has come in England to have the sound of "a" in class, father, &c. So far as I know, this usage is nowhere followed in America.[1] But the pronunciation of "a" in bath,

[1] The fact that the proper name Clark (which is unquestionably the equivalent of clerk) has been for hundreds of years in use in England, shows that the pronunciation *Clark* is hundreds of years old. So also the existence of an American Hartford shows that

class, &c., like "a" in "father," though it seems to have sounded strange in Mr. Wilkie's Western ears, is common enough—is indeed the accepted usage—in the Eastern States. It is also the usage sanctioned by Webster.

It is hardly necessary to say that Mr. Wilkie represents the omission and misuse of the aspirate as though they were as common amongst the educated as among the uneducated classes of this country. A hasty reader might, indeed, rashly infer from some passages in Mr. Wilkie's book that there is a difference between the ignorant and the decently educated in this respect. For instance, in a rather overdrawn scene in Westminster Hall, a policeman tells Mr. Wilkie and Mr. Hatton to "pass into the 'all"; to which, not Mr. Wilkie, but the Englishman, Mr. Hatton, replies, "pass into the 'all! I say, Bobby, my boy, you dropped something. You dropped an *aitch*. But never mind! You just go into the House, and you'll find the floor covered with *aitches* dropped by the members. You can find there twice as many as you have lost here. Pass into the *'a—a—all!*" But then it is only to be inferred from this, that by associating with his American friend Mr. Wilkie, Mr. Hatton had learned to speak more correctly than other Englishmen. It was in this way that Americans ex-

the Pilgrim Fathers called Hertford Hartford? Probably the "a" in such words as Clark, farm, &c., had originally the sound of "a" in "care." Indeed, if we consider the French origin of these words, we see that this must have been so.

plained the fact that Mrs. Trollope used the aspirate correctly. And to this day it is the prevalent (and almost universal) opinion in America that all Englishmen, educated as well as uneducated, drop their *aitches*, and insert *aitches* where none should be. I have been gravely assured time and again by Americans, claiming at any rate to be decently well-informed, that I have no trace *left* of the "English accent," which they explain as chiefly to be known by omitted and misused aspirates. They neither know, for the most part, that the omission or misuse of the aspirate is as offensive to the English as to the American ear, (more so, indeed; for to the American it is simply laughable, while to the English ear it is painful), nor that the habit is to all intents and purposes incurable whenever it has once been formed. An Englishman who, owing to imperfect education or early association with the ignorant, has acquired what Americans regard as the English accent, may indeed learn to put in a sort of aspirate in words beginning with *aitch*, but it is an aspirate of an objectionable kind—fully as offensive as an aspirate in heir, hour, and honour. Thackeray touches on this in one of his shorter sketches. The habit of using aspirates in the wrong place may perhaps be more easily cured; but as this habit is only found among the very ignorant, while the habit of dropping the aspirate is much more widely spread, the opportunities for testing the matter by observation are few. Many who drop their *aitches* know at least where the *aitches* should be, and by an

effort put in unduly emphatic aspirations; but probably very few, and possibly none, of those who put in *aitches* where none should be, are able to spell. From a story told me by an American, it would even seem that those who thus wrongly insert *aitches*[1] have ears too gross to recognise the difference between the correct and the incorrect pronunciation. He told me he offered an English boy in his employment ten cents to say "egg," "onion," "apple"; on which the boy said, "Hall right; hegg, honion, happle; 'and us hover the ten cents": "No," he replied, "you are not to say hegg, honion, happle, but egg, onion, apple." "Well, so I did," was the cheerful response; "*you* say hegg, honion, happle; and Hi say hegg, honion, happle." But perhaps my informant exaggerated.

It should be noticed that in one respect the English, even when well educated, are very careless, to say the least, in the use of the aspirate. I refer to their pronunciation of words beginning with "w" and "wh." We too often hear *when*, *where*, *whale*, and so forth, pronounced like the words *wen*, *were*, *wail*, &c. In America this mistake is never made. They do not pronounce the words as educated Irishmen often, if

[1] In passing, I may remark that the word *ache* was formerly pronounced aitch, so that the word *aches* used to be a dissyllable. Thus Beatrice, in *Much Ado About Nothing*, says she is exceeding ill—not for a hawk, a horse, or a husband, but for that which begins them all, "H," that is, through an' ache or pain; just as two scenes earlier her fellow-victim, Benedict, says he has the toothache.

not generally do, hwen, hwere, hwale; that is, with an exaggerated aspirate, giving the words with a *whish*, as it were; but they make the distinction between "w" and "wh" very clear. I am inclined, by the way, to believe that the Irish mode of pronouncing words beginning with "wh" is in reality that which was in use in former times in England, probably at an earlier date than that of the Pilgrim Fathers; at any rate, hwat, hwen, &c., is the spelling in Old English and Saxon books.

There are faults of pronunciation which, so far as I can judge, are about equally common in both countries,—for instance, "sech" for "such," "jest" for "just,"[1] "ketch" for "catch," "becos" for "because," "instid" for "instead," sometimes even "forgit" for "forget." But we certainly do not so often hear "doo" for "due," "soo" for "sue," and so forth, in England, as in America. "Raound" for "round," "claoud" for "cloud" is very common in New England; but perhaps not more so than in certain districts in England. In the Southern States, peculiarities of pronunciation are often met with which had their origin in the association of white children

[1] It is worthy of notice that the pronunciation of certain vowels depends in great part on the consonant which precedes, and in part also on that which follows, the vowel. Thus the "u" in *such* is often mispronounced, the "u" in *much* never, the u in *just* often, the "u" in *must*, *lust*, and *rust* never, and the "u" in *judge* seldom. In America "jedge" for "judge" is often heard, however. So no one ever says *los* for *laws*, but many say beco: for because, and *cos* for *'cause*.

with negroes. Among these, perhaps the most remarkable is the omission of the "r" in such words as door, floor, &c., pronounced by negroes, do', flo', &c.

Let us next consider the different use of certain words and phrases in the two countries.

Mr. Wilkie says, holding still by his calm and quite erroneous assumption, that the change is all on one side, "the difference between the spelling of words and their sound is not all there is to prove that the English are losing the English language, and substituting a jargon that is totally unlike that speech bequeathed to us by our Saxon and Norman ancestors. What, for instance, is to be done by a man understanding and recognising the English of Macaulay, Longfellow, Byron, Lamb, Whittier, Grant White, and the expurgated vernacular of the venerable Bryant, who finds that a street sprinkler in England's English is a 'hydrostatic van'; that rails on a railroad are 'metals'; a railroad track is a 'line'; a store a 'shop'; a hardware-man an 'ironmonger'? He finds no policemen here but 'constables.' If he go into a store and ask for 'boots,' he will be shown a pair of shoes that lace or button about the ankle. There are no groceries or dry-goods stores. Baggage is 'luggage'; a travelling-bag is a 'grip-sack'" (a word which I have never heard out of America, and which I believe to be quite unknown in England); "there are no trunks, but always 'boxes.' A freight-car is a 'goods-van'; a conductor on a 'bus or railway is a

'guard'; a street railway is a 'tramway'; a baggage-car, a 'luggage-van'; a pitcher is a 'jug'; and two and a half pence is 'tuppence 'apenny.' A sovereign is a 'squid'" ("quid" or "couter" would be nearer the mark, if we must consider slang to be part of a language); "a shilling, a 'bob'; a sixpence, a 'tanner.'" He might conveniently have added for the information of Americans who wish to understand English English, and of Englishmen who wish to understand American English, that in England a "biscuit" is a "roll," and a "cracker" is a "biscuit."

Now, all this, unless it is intended for an elaborate (and exceedingly feeble) joke, is absurd on the face of it. To begin with, it would be difficult to find any authority in the works of Macaulay, or the other writers named, for street-sprinkler, hardware-man, groceries and dry-goods stores, travelling bags, freight-cars, and street-railways. But apart from this, nearly all the words to which Mr. Wilkie objects are much older and better English than those which Americans have substituted. For instance, the word "shop" is found in English writings as far back as the fourteenth century, whereas "store" has never been used, in the American sense, by any English writer of repute. Manifestly, too, the word "store," which has a wider meaning, and has had that meaning for centuries, is not suitably applied to a shop, which is but one particular kind of store. There can be very little doubt that originally Americans substituted the word "store" for "shop," for much the same reason

that many shopkeepers in England choose to call their shop a warehouse, or an emporium, or a mart, or by some other equally inappropriate name. Again, baggage and luggage are both good English; but on the whole, the word luggage is more suitable than baggage for goods which have to be conveyed by train or carriage: (one may say that baggage is the statical, luggage the dynamical, name for the traveller's *impedimenta*). Unquestionably there is good authority, and that too in old authors, for the use of both terms. Of course we have trunks in England, despite Mr. Wilkie's assertion to the contrary; we have boxes also. Very few Americans can tell offhand, and many do not know, the real distinction between a trunk and a box; few again, either in England or in America, know the distinction between a house and a mansion. Freight-car is a good word enough,—the freight half of it being better than the other, for the word car is not properly applied to a van; but goods-van is in all respects better: "freight" is a technical term, "goods" everyone understands, and "van" is a better word than "car." The word "boot" again, is properly applied to any foot-covering (outside the sock or stocking) which comes above the instep and ankle.

Turning from trivialities such as these, let us now note some points in which English and American speakers and writers of culture differ from each other, —first as to the use of certain words, and secondly as to certain modes of expression.

In America the word "clever" is commonly understood to mean pleasant and of good disposition, not (as in England) ingenious and skilful.[1] Thus, though an American may speak of a person as a clever workman, using the word as we do, yet when he speaks of another as a clever man, he means, in nine cases out of ten, that the man is good company and well-natured. Sometimes, I am told, the word is used to signify generous or liberal. I cannot recall any passages from early English literature in which the word is thus used, but I should not be surprised to learn that the usage is an old one. In like manner, the words "cunning" and "cute" are often used in America for "pretty" (German *niedlich*). As I write, an American lady, who has just played a very sweet passage from one of Mozart's symphonies, turns from the piano to ask "whether that passage is not cute," meaning pretty.

The word "mad" in America seems nearly always to mean "angry"; at least, I have seldom heard it used in our English sense. For "mad," as we use the word, the Americans say "crazy." Herein they have manifestly impaired the language. The words "mad" and "crazy" are quite distinct in their significance as used in England, and both meanings require to be expressed in ordinary parlance. It is obviously a

[1] I have been told by an American literary man that twenty years ago the word "clever" in America always meant pleasant and bright, whereas it is now generally used as in England. in the West it generally bears the former sense.

mistake to make one word do duty for both, and to use the word "mad" to imply what is already expressed by other and more appropriate words.

I have just used the word "ordinary" in the English sense. In America the word is commonly used to imply inferiority. An "ordinary actor," for instance, is a bad actor; a "very ordinary man" is a man very much below par. There is no authority for this usage in any English writer of repute, and the usage is manifestly inconsistent with the derivation of the word. On the other hand, the use of the word "homely" to imply ugliness, as is usual in America, is familiar at this day in parts of England, and could be justified by passages in some of the older English writers. That the word in Shakespeare's time implied inferiority is shown by the line—

> Home-keeping youths have ever homely wits.

In like manner, some authority may be found for the American use of the word "ugly" to signify bad-tempered.

Words are used in America which have ceased to be commonly used in England, and are, indeed, no longer regarded as admissible. Thus, the word "unbeknown" which no educated Englishman ever uses, either in speaking or in writing, is still used in America in common speech and by writers of repute. Thus, in "*Harper's Monthly*" for May, 1881 (whose editors are well-known literary men), I find, at page 834, the following sentence in a story called "The

Unexpected Parting of the Beazley Twins,"—"While baiting Lottie's hook, as they sat together on a log on the water's bank, he told her, almost unbeknown to himself, the state of his feelings."

Occasionally, writers from whom one would expect at least correct grammar make mistakes which in England would be regarded as very bad—mistakes which are not, indeed, passed over in America, but still attract less notice there than in England. Thus, Mr. Wilkie, who is so severe on English English in "Sketches beyond the Seas," describes himself as saying (in reply to the question whether Chicago policemen have to use their pistols much), "I don't know *as* they have to as a matter of law or necessity, but I know they do as a matter of fact;" and I have repeatedly heard this incorrect use of "as" for "that" in American conversation. I have also noted in works by educated Americans the use of the word "that" as an adverb, "that excitable," "that headstrong," and so forth. So the use of "lay" for "lie" seems to me to be much commoner in America than in England, though it is too frequently heard here also. In a well-written novelette called "The Man who was not a Colonel," the words—"You was" and "Was you?" are repeatedly used, apparently without any idea that they are ungrammatical. They are much more frequently heard in America than in England (I refer, of course, to the conversation of the middle and better classes, not of the uneducated). In this respect it is noteworthy that the writers of

the last century resemble Americans of to-day; for we often meet in their works the incorrect usage in question.

And here it may be well to consider the American expression "I guess," which is often made the subject of ridicule by Englishmen, unaware of the fact that the expression is good old English. It is found in a few works written during the last century, and in many written during the seventeenth century. So careful a writer as Locke used the expression more than once in his treatise "On the Human Understanding." In fact, the disuse of the expression in later times seems to have been due to a change in the meaning of the word "guess." An Englishman who should say "I guess" now, would not mean what Locke did when he used the expression in former times, or what an American means when he uses it in our own day. We say, "I guess that riddle," or "I guess what you mean," signifying that we think the answer to the riddle, or the meaning of what we have heard, may be such and such. But when an American says, "I guess so," he does not mean "I think it may be so," but more nearly "I know it to be so." The expression is closely akin to the old English saying, "I wis." Indeed, the words "guess" and "wis" are simply different forms of the same word. Just as we have "guard" and "ward," "guardian" and "warden," "Guillaume" and "William," "guichet" and "wicket," &c., so have we the verbs to "guess" and to "wis": (In

the Bible we have not "I wis," but we have "he wist"). "I wis" means nearly the same as "I know," and that this is the root-meaning of the word is shown by such words as "wit," "witness," "wisdom," the legal phrase "to wit," and so forth. "Guess" was originally used in the same sense; and Americans retain that meaning, whereas in our modern English the word has changed in significance.

It may be added, that in many parts of America we find the expression "I guess" replaced by "I reckon," and "I calculate" (the "I cal'late" of the *Biglow Papers*). In the south, "I reckon" is generally used,[1] and in parts of New England "I calculate," though, (I am told) less commonly than of yore. It is obvious from the use of such words as "reckon" and "calculate" as equivalents for "guess," that the expression "I guess" is not, as many seem to imagine, equivalent to the English "I suppose" and "I fancy." An American friend of mine, in response to the question by an Englishman (an exceedingly positive and dogmatic person, as it chanced), "Why do Englishmen never say 'I guess?'" replied (more wittily than justly), "Because they are always so positive about everything." But it is noteworthy that whereas the American says frequently, "I guess," meaning, "I

[1] The first time I heard this expression, it was used in a short sentence singularly full of Southern (or perhaps rather negro) phraseology. I asked a negro driver at the Louisville station or *dépôt* (pronounced *deepoe*) how far it was to the Galt House, to which he replied, "*a right smart piece I reckon.*"

know," the Englishman as freely lards his discourse with the expression, "You know," which is, perhaps, more modest. Yet, on the other side, it may be noted, that the "down east" American often uses the expression "I want to know," in the same sense as our English expression of attentive interest "Indeed?"

Among other familiar Americanisms may be mentioned the following:—

An American who is interested in a narrative or statement will say, "Is that so?" or simply "So!" The expression "Possible!" is sometimes, but not often, heard. Dickens misunderstood this exclamation as equivalent to "It is possible, but does not concern me"; whereas, in reality, it is equivalent to the expression, "Is it possible?" I have occasionally heard the exclamation "Do tell!" but it is less frequently heard now than of yore.

The word "right" is more frequently used than in England, and is used also in senses different from those understood in our English usage of the word. Thus, the American will say "right here" and "right there," where an Englishman would say "just here" or "just there," or, simply, "here" or "there." Americans say "right away" where we say "directly." On the other hand, I am inclined to think that the English expression "right well," for "very well," is not commonly used in America.

Americans say "yes, sir," and "no, sir," with a sense different from that with which the words are used in England; but they mark the difference of

sense by a difference of intonation. Thus, if a question is asked to which the reply in England would be simply "yes" or "no" (or, according to the rank or station of the querist, "yes, sir," or "no, sir,"), the American reply would be "yes, sir," or "no, sir," intonated as with us in England. But if the reply is intended to be emphatic, then the intonation is such as to throw the emphasis on the word "sir,"—the reply is "yes, *sir*," or "no, *sir*." In passing, I may note that I have never heard an American waiter reply "yessir," as our English waiters often do.

The American use of the word "quit" is peculiar. They do not limit the word, as we do, to the signification "take leave"—in fact, I have never heard an American use the word in that sense. They generally use it as equivalent to "leave off" or "stop." (In passing, one may notice as rather strange the circumstance that the word "quit," which properly means "to go away from," and the word "stop," which means to "stay," should both have come to be used as signifying to "leave off.") Thus, Americans say "quit fooling" for "leave off playing the fool," "quit singing," "quit laughing," and so forth.

To English ears an American use of the word "some" sounds strange—viz., as an adverb. An American will say, "I think some of buying a new house," or the like, for "I have some idea of buying," &c. I have indeed heard the usage defended as perfectly correct, though assuredly there is not an

instance in all the wide range of English literature which will justify it.

So also, many Americans defend as good English the use of the word "good" in such phrases as the following:—"I have written that note good," for "well"; "it will make you feel good," for "it will do you good"; and in other ways, all equally incorrect. Of course, there are instances in which adjectives are allowed by custom to be used as adverbs, as, for instance, "right" for "rightly," &c.; but there can be no reason for substituting the adjective "good" in place of the adverb "well," which is as short a word, and at least equally euphonious. The use of "real" for "really," as "real angry," "real nice," is, of course, grammatically indefensible.

The word "sure" is often used for "surely" in a somewhat singular way, as in the following sentence from "Sketches beyond the Sea," in which Mr. Wilkie is supposed to be quoting a remark made by an English policeman: "If policemen went to shooting in this country, there would be some hanging, sure; and not wholly among the classes that would be shot at, either." (In passing, note that the word "either" is never pronounced *eyether* in America, but always *eether*, whereas in England we seem to use either pronunciation indifferently.)

An American seldom uses the word "stout" to signify "fat," saying generally "fleshy." Again, for our English word "hearty," signifying "in very good health," an American will sometimes employ the

singularly inappropriate word "rugged." (It corresponds pretty nearly with our word "rude"—equally inappropriate—in the expression "rude health.")

The use of the word "elegant" for "fine" strikes English ears as strange. For instance, if you say to an American, "This is a fine morning," he is likely to reply, "It *is*; an elegant morning," or perhaps oftener by using simply the word "Elegant." It is not a pleasing use of the word.

There are some Americanisms which seem more than defensible—in fact, grammatically more correct than our English usage. Thus, we seldom hear in America the redundant word "got" in such expressions as "I have got," &c., &c. Where the word would not be redundant, it is generally replaced by the more euphonious word "gotten," now scarcely ever heard in England. Yet again, we often hear in America such expressions as "I shall get me a new book," "I have gotten me a dress," "I must buy me that," and the like. This use of "me" for "myself" is good old English, at any rate.

I have been struck by the circumstance that neither the conventional, but generally very absurd, American of our English novelists, nor the conventional, but at least equally absurd, Englishman of American novelists, is made to employ the more delicate Americanisms or Anglicisms. We generally find the American "guessing" or "calculating," if not even more coarsely Yankee, like Reade's Joshua Fullalove; while the Englishman of American novels is almost always

very coarsely British, even if he is not represented as using what Americans persist in regarding as the true "Henglish haccent." Where an American is less coarsely drawn, as Trollope's "American Senator," he uses expressions which no American ever uses, and none of those Americanisms which, while more delicate, are in reality more characteristic, because they are common, all Americans using them. And in like manner, when an American writer introduces an Englishman of the more natural sort, he never makes him speak as an Englishman would speak; before half-a-dozen sentences have been uttered, he uses some expression which is purely American. Thus, no Englishman ever uses, and an American may be recognised at once by using, such expressions as "I know it," or "That's so," for "It is true"; by saying "Why, certainly," for "Certainly" (this was written before *The Colonel* came out); and so forth. There are many of these slight but characteristic peculiarities of American and English English.

NORMAN AND SAXON BLOOD ROYAL.

BY THOMAS FOSTER

THE associated doctrines of development and heredity are more important in their relation to the human race than as they affect other races of animals or the various orders of vegetable life. Unfortunately, they

cannot be so easily tested among men as among plants and the inferior animals. There have been some cases in which men have been treated in some respects like animals under domestication, as for instance in certain slave-breeding districts. But even in such cases the influence of the affections, though restrained, was not destroyed; and the process of selection which slave-breeders would have liked to carry out systematically was considerably interrupted. Besides, slave-breeders were unable to hasten the growth of individual specimens of their art, so that in the lifetime of a single slave-breeder not more than two or three generations of slaves could be dealt with; and in two or three generations selection can produce no very marked results. Nor, again, can the effects of natural selection be noted in the case of the more civilised races of men; seeing that multitudes of relations, other than those which are involved in ordinary natural selection, come into active operation among communities of men. To mention one point only—the inheritance of property. Under the older law—

> the simple plan,
> That they should take who have the power,
> And they should keep who can,

—the choice of a wealthy wife or husband, as the case might be, would always involve, more or less directly, the influence of the forces which are active in natural selection. The brave and the strong would be the chief owners of wealth, and would preserve

their wealth for their children, male or female, who would probably inherit also their personal qualities. But in civilised communities, where a definite law of succession is established, property will often pass to persons very deficient in the personal qualities which would favour success in a struggle for existence. In fact, it may frequently happen that a contest between two opposing causes of change may come into operation. The possession of property usually implies that somewhere along the line of descent to the wealthy person there has been energy and skill, while along a considerable portion of the line there has probably been care and prudence. But to be born to wealth removes those reasons for the exercise of energy, skill, and prudence which influence persons not so favoured by fortune. Thus there may arise in the course of several generations a tendency to idle and careless habits; and it may be exceedingly difficult in later generations to distinguish between the effects of these qualities in the nearer ancestry and opposite qualities in the remoter ancestry. In like manner, other relations of civilised life render the task of tracing the phenomena of heredity difficult and perplexing.

Apart also from such causes of difficulty, we seldom have the means of ascertaining what is the actual ancestry of particular persons. Even in the case of distinguished men, we can seldom learn anything about the ancestry preceding the grandparents. For before the great man appears (unless he belongs to a titled family) no one cares specially to note the

marriages and intermarriages of the family; and when he has come, it is too late to obtain trustworthy records.

In the case of titled families, we have some means of tracing the ancestry, though usually only along the main line of descent. But we have few means, except in one or two special cases, of ascertaining what may have been the personal qualities of the various ancestors of any man whose own qualities seem likely to throw light on the laws of heredity. Besides, it is doubtful how far it would be within our right to discuss a man's ancestry or his personal qualities in such a way. And even it were permissible to do so, it would be in questionable taste. If it were not impertinent, it would be servile.

In the case of royal families, however, we not only have better materials for such an inquiry, but we have the right to make it. Nay, I am not sure that an occasional inquiry of the sort is not a duty we owe to ourselves. For reasons into which I need not here enter, many races of men have found it convenient to put themselves under the power of a single ruler, or else have been unable to save themselves from being thus brought under the control of such a ruler. Commonly, therefore, the first beginning of kingship in any nation has resulted from the possession of superior qualities, bodily or mental, by some man who has thus either perforce caused the rest to submit to him, or has been elected to "go out before his people, and fight their battles." But in the long run, the suc-

cession of kings over a nation has usually come to depend on blood relationship. Thus it has come to involve a sort of contract; though often matters may be so situated that the people reigned over by any family have had small power to determine whether the contract shall remain in force or not. The king or chief succeeds by virtue not of his personal qualities but of his relationship to his predecessor. His actual power is usually somewhat less than that exerted by the earliest kings of the dynasty; but, on the other hand, he has not the same occasion to exert his personal qualities, either on his people's behalf or in order that he may retain them under him.

Clearly a relationship of this sort, whether the ruler's power be greater or less, yields so much, at any rate, to the ruler, that the people have a right to examine—or, rather, the people can examine without offence against good taste—into the qualities of their kings, whether in the past or at the present time. It would be an impertinence to note that Lord A. or Earl B. has such and such personal qualities (other than those affecting the discharge of the duties of any office he may hold), or to note the personal qualities of various members of his family. And it is indeed equally an impertinence to comment on personal qualities in the king, if such comments are suggested merely by the interest which persons of debased minds take in those who are placed in conspicuous positions. But it is quite otherwise with an inquiry into the personal qualities of our kings

suggested by the consideration that the well-being of the nation is affected by those qualities. An inquiry of this sort is perfectly legitimate and may often be most useful. It is in no way connected with mere curiosity, and is, indeed, more likely to be pursued by persons who care nothing whatever about the royal family in any other way, than by the feeble-minded folk who take interest in the Court Circular. For my own part, I may frankly confess that, except in this way, the royal family is less interesting to me than the family of my next neighbour, in whose concerns, nevertheless, I only take interest in so far as they affect myself. It is a matter of moment to me, as to every Englishman, to know what are the probabilities that the sovereign's influence will be used in this way or in that upon cabinet ministers, and therefore to know what are the leading features of the sovereign's disposition, what his chief tastes, proclivities, and so forth. For experience shows—and we have recently had very marked illustration of the fact—that ministers may be often very much influenced by the sovereign's views, and that thus the welfare of the nation may be importantly affected by his influence. Were it not for this, I apprehend that every man of sense would consider an inquiry into the personal qualities of the sovereign a waste of time, while every gentleman would feel that such an inquiry was altogether in bad taste. But, as matters actually are, not only the mental, but even the physical characteristics of the king or queen are of interest. For

history has shown, time and again, that not only a fit of temper, but an attack of illness, may affect the property and even the lives of men living under a monarchy not less limited than that of our own country.

Fortunately, as the relation of monarchs to their people gives these the right to inquire into the personal qualities of the former and of their progenitors, so also the circumstances of monarchical government are such as to enable us to examine the development of various qualities in royal families, to trace the growth and progress or the gradual decay of certain peculiarities of disposition and temper. In fact, we are enabled in this case, and fortunately we have the right, to study the laws of heredity in the human race. It is true the class of persons to whom our study is restricted is likely to differ in many respects from the average: their manner of life is abnormal, the arrangements regulating their marriages are exceptional, and in other respects the circumstances of the inquiry differ from those which the student of science would select if the matter rested with him. Yet, on the whole, we may expect useful evidence from such an inquiry, both in its scientific and in its historical or utilitarian aspect.

I select for the present inquiry the royal family of England, as the one about which we can obtain the readiest and the fullest information. I propose to consider this family at present chiefly with reference to the title by which it claims to be first in England:

in other words, to trace the earlier lines of descent from Rollo the Ganger to William the Norman, and from Cerdic the Saxon to Edgar the Atheling.

It does not seem to be commonly known that, strictly speaking, the queen has a better right in blood to the position she occupies, as being descended from James I. (of England), than as being descended from William I. Of course long-continued possession gave to the house of Plantagenet, and to its Lancastrian, Yorkist, and Tudor representatives, a more effective claim to the English throne than the kings of Scotland possessed. But in strict right the kings of Scotland were far better entitled to the throne of England than any of the house of Plantagenet; for they were the actual heirs of Egbert, the first Saxon king who held widely extended sway in England otherwise than by the consent of other chiefs.[1]

However, it will be more convenient to consider the descent of the present royal family from William the Conqueror first, as that is the line along which the descent is usually traced; the right of James I. being regarded as derived through the daughter of Henry VII., not from Egbert.

William I. should in strictness be regarded as founder of the Norman line in England, as he had no

[1] There had been Bretwaldas, or Rulers over Britain, before him, but only by the agreement of other chiefs to regard one as supreme. Egbert, not by right of birth, but by force of will, exercised such a rule independently of the consent of the other Saxon chiefs.

legal right, according to our present views, even to the dukedom of Normandy. He was not only illegitimate, but there were legitimate representatives of Rollo, the founder of the Norman family in France. But it is essential for my present purpose that the line from Rollo to William should be considered, for it affords even better evidence of the character of the Norman ancestors of the royal family than the line from William onwards. After William's time we recognise a gradual change of character, resulting no doubt from the well-marked characteristics of the various families with which the Norman kings of England intermarried.

We carry back our survey, then, to Rollo, probably the most active and enterprising of all the pirate chiefs of the centuries following the breaking up of the Roman Empire. Undoubtedly his character may be traced far downwards along the line of descent, though continued, early in English history, through a woman.

Rollo the Ganger, as he was called because of his activity (variously named Raoul, Rolf, Rou, Harval, and even Robert), must have been a man of singular energy of character, and also of great administrative skill. He ravaged the north and south of France, the Low Countries, and England, between the years 876 and 911. In the last-named year he even led a large army to the siege of Paris; and though he seems to have been foiled in this enterprise, he succeeded in obtaining from Charles the Simple the

cession of the province of Normandy and the hand of Giselle, Charles's daughter, in marriage. In proof of his administrative energy, we have the fact that in a few years he introduced the feudal system into his duchy more thoroughly than others had established it elsewhere in a much longer time and under much more favourable conditions. He made his people give up their predatory habits so completely, that it is said a bracelet suspended from an oak in a forest near the Seine was left untouched for three years. The story may not be true, but it shows what opinion was formed of him. That he was rough and brutal may be conceded without necessarily implying that he was inferior to other men of his own time and in a similar position. His behaviour, when called on to render homage to Charles as sovereign of his duchy, showed that he did not allow the principles of the feudal system to influence his own conduct. Theoretically, the same ready compliance with feudal forms which he required from his own followers, he should have shown to the king from whom he accepted the fief of Normandy. But he refused to go through the required forms in his own person, and it was doubtless in compliance with his own wishes that the soldier who performed the act of homage, handled Charles's foot, which he ought to have kissed, so roughly, as to pull that simple king out of his chair: an achievement which elicited shouts of laughter from the Normans standing around. It has commonly been said that Rollo was as weak in matters of religion as he was

stout in war and stern in kingship. But as the duchy of Normandy and the alliance with the royal family of France were the reward of his submission to the Church, it seems likely that policy had as much to do with his action in this matter as either superstition or religious feeling.

On the whole, Rollo was an ancestor of whom the Norman line had no reason to be ashamed. He was a pirate, but he lived in an age when predatory exploits were regarded with admiration. He was harsh and cruel, but tenderness and humanity were not held in great esteem in his time; and a man must be judged in part by the age in which he lived. In these times, a man of Rollo's tastes and habits would only escape the gallows by being hanged at the yard-arm or shot through the head. But in the year 900 he was regarded as a worthy and able prince.

His son, William Longsword, added to the power of the Norman dynasty, and extended the dominions acquired by his father. His character showed some taint of treachery; for in the civil dissensions of France he forsook his party for that of the rival of Louis IV., Otho the Great of Germany; and eventually he forsook Otho for Louis. He would have abdicated and entered a monastic order, but shortly before the time appointed for this he was assassinated.

Here the legitimate line was interrupted, and the first instance afforded of what the Normans came later to regard as a sort of law—viz., that in every three generations (at the utmost) some great change

would affect the reigning family. William left only one son, a boy of ten and a bastard. But the Normans recognised the lad as the successor of William. We see here that action of what doubtless, in the first instance, gave birth to the feeling of loyalty or devotion to a particular family. The Normans perceived that under the able administration of Rollo and William their nation had achieved success. They were thus led to believe that this good fortune was associated in some way with the blood of their reigning family, and would desert the nation if chiefs not of that blood were raised to the supreme power. Despite the feeling which would naturally have led other chiefs to try to seize the ducal throne, they thought it safer and better for them to keep the succession in the line of Rollo's descendants, even though illegitimate. There was an unconscious recognition here of the principle of heredity: a true recognition, because the observed fact on which their action was based depends on the inheritance by the children of the personal qualities of their progenitors; but an unconscious recognition, because a fanciful and incorrect explanation was given to the observed facts.

Richard, the Fearless, as he was called, was an abler prince than William Longsword, and took a higher position among the nobles of France. It was chiefly to his energy and influence that Hugues Capet owed his success in usurping the French throne on the death of Louis V.

The son of Richard Sans Peur was Richard II., surnamed The Good. It is not easy to ascertain the grounds on which this honourable title was based. One of the most remarkable events in the good king's reign suggests the propriety of a quite different epithet. The peasantry of Normandy, long held in degrading subjection, endeavoured in this reign to lighten the burden of their yoke. At one of their secret assemblies, attended by two deputies from each county of the duchy, an interruption occurred. Richard le Bon despatched a band of soldiers, who seized the deputies and, having cut off their hands and feet, sent them home as a warning to the peasantry.

Richard III., who succeeded this Good Richard, showed the courage and energy of his race. He obliged his brother Robert to submit to him, but soon after died—by poison, many thought.

Robert succeeded. He rejoiced in two epithets, both according well with the characteristics of the family. He was called The Magnificent, because of his exploits and the splendour of his court; while, in virtue of his ferocity and licentiousness, he was called *Robert le Diable*. William, second of Normandy and first of England, was his bastard son.

Of William's mother, Herleva or Arlotta, little is known. Indeed, the men of the Norman line transmitted their qualities so strikingly to their sons that it would have aided us little to have considered the qualities of the wives or concubines, as the case may

be, whom they honoured with their affections. Up to William's time we have seen a succession of energetic and skilful, though fierce and brutal rulers, each of whom took up the work begun by his predecessor and continued it in the same fashion, and with but slightly varying success. The results obtained by this long-continued succession of able and energetic princes are well worth noting. The Normans had become in less than two centuries the foremost race in Europe. Without losing the fierce valour which had distinguished the followers of Rollo, they had acquired skill in warlike exercises and a mastery of the art of war, such as their ancestors had never possessed. They were as distinguished for skill in negotiation as for courage in the field. There was scarcely a part of Europe where they had not made their energies felt, while in the East they had been the most successful of the first Crusaders. They were still coarse and brutal, according to our modern conceptions, but they were regarded by their contemporaries as not less chivalrous than courageous. Compared with Saxon nobles, the nobles of Normandy were graceful in manners and polished in habits of life. One of their historians boasts that every Norman gentleman was a born orator.

To the Norman race the princely qualities of their rulers had been advantageous. It was otherwise to the people of England after the Norman conquest. The military skill of William the Conqueror enabled him to bring the English people into subjection

under him; the courage and energy of his successors during four generations enabled them to retain the supremacy which he had acquired. It was when a weak prince inherited the throne that the English people began to breathe again the breath of freedom —though, even then, they owed the change to Norman nobles.

In the first generation after William I., we find Robert, William II., and Henry I. Robert was probably the weakest of the descendants of Rollo up to that, the sixth generation. We are not here concerned with his fortunes, however, except as they illustrate the development of personal qualities in the race of the Norman kings. Another Rollo or Richard Sans Peur would not have been content with a portion of his father's kingdom. But Robert, the eldest of William's sons, lost even the duchy of Normandy, and eventually died in a dungeon, the prisoner of Henry I. of England, his youngest brother.

Of William II. and Henry I. I say nothing here, as they are sufficiently familiar historical characters, as also are the remaining kings and their kinsfolk who belong to the line of descent from Rollo the Ganger to the present occupant of the throne.

The fact that the royal family of England descends directly from the Saxon kings of England seems less generally known than it should be, when we consider that, according to the "right divine" theory, the claim to the British crown is much stronger on this ground than as based on descent from William I.

The Queen is not, indeed, actually the nearest in blood to Egbert and Alfred of all persons at present living, for she is not the nearest in blood to James I.; but she is the nearest after those members of the family whose claims were set aside by the Act of Settlement.

In the same way that William I. may be regarded as first of the Norman line, though we found it well to carry back the line to Rollo the Danish pirate, so Egbert, surnamed the Great, may be regarded as first of the Saxon line, while yet we shall find it well to trace the descent (as far as we can) from Cerdic the Saxon pirate. I say "as far as we can," because the line of descent from Cerdic to Egbert is not so well made out as that from Rollo to William the Conqueror.

Of Cerdic (pronounced Kerdic) we know little. That he was brave and enterprising we can safely infer from what little is known of him. Hengist had established himself in Kent in 173. In 477 Ælla had landed in Sussex, and by the year 491 had succeeded in founding the kingdom of Suth Seaxe, or Sussex. Five years later Cerdic appeared in the Channel with five long ships, or chiules. Sailing past the shores of Kent and Sussex he landed at Cerdicsore, supposed to be Yarmouth in the Isle of Wight. (Higden simply says Yarmouth, but it is hardly necessary to say that Cerdic did not land at Great Yarmouth.) Cerdic was stoutly resisted by Natanleod, king of the region including Somersetshire and Hampshire, and was unable to obtain possession of this region for

many years. He received important co-operation from other chiefs, who arrived from Saxony with bands of fighting-men. In 508 Natanleod defeated Cerdic in battle, but, pursuing him unguardedly, was attacked by Cynric, Cerdic's son, and slain, with 5,000 of his warriors. Six years later, Stuffa and Whitgar, Cerdic's nephews, arrived with three long ships at Cerdicsore (which surely must have been on the mainland, whatever Higden may say to the contrary); and at last, in 519, a great victory, won at Charford on the Avon, enabled Cerdic to establish the kingdom of West Seaxe, or Wessex. Here Cerdic reigned till 534, when he died, and was succeeded by Cynric.

We can form a clearer opinion of the family of which Cerdic was the chief, from the behaviour of others than from the meagre account we have of his own doings. Brave his race certainly was, but as certainly it was savage and brutal. His nephews, Stuffa and Whitgar, to whom he assigned the sovereignty of the Isle of Wight, established their supremacy there by the simple expedient of killing every Briton in the island.

It may be worth mentioning, in passing, that the last of the victories of King Arthur, the victory of Mount Badon, is supposed to have been gained over either Cerdic or Cynric. But the evidence is very doubtful.

Of Cynric we know even less than we know of Cerdic. He does not seem to have been possessed of

greater skill and energy than other Saxon chiefs of his time, for had this been the case he would probably have attained the title of Bretwalda, or Chief of Britain. Ælla, the first Bretwalda, died in 518, and neither Cerdic nor Cynric held the title; but Ceawlin, Cynric's son, who succeeded to the throne of Wessex in 560, was recognised as Bretwalda from 568 to 589. He seems to have possessed considerable energy, but to have been ferocious and brutal. In the later years of his reign his own subjects rose against him, and, assisted by the Angles and the Britons, fought a great battle against him at Woodensbury in Wiltshire. He was defeated and driven from the throne.

Here we lose the line of descent to Egbert. The successor of Ceawlin was his nephew, Ceolric, who was succeeded by his brother, Ceolwulf. The kingdom was next divided between Cynegils and Cuichelm. Cynegils, who survived Cuichelm seven years, was succeeded by his son Coinwalch, who died without children. Cadwalla, a descendant of the house of Cerdic, next (after a struggle of some duration) secured the supreme power. He was succeeded by Ina, who traced his descent from Ceawlin the Bretwalda. Ina reigned thirty-seven years. Æthelherd and his brother Cuthred, also descended from Ceawlin, next reigned, then Sigebrycht, Cynewulf, and Brihtric. Lastly, Egbert, descended from Inigils the brother of Ina, and thus from Cerdic, through Ceawlin, succeeded to the throne of Wessex, in 800, the year of Brihtric's death.

Although we have no means of tracing the exact line of Egbert's descent from Cerdic, and thus can form no clear opinion of the qualities which he might be supposed to inherit, yet we know that he was the only remaining prince of the house of Cerdic, and may infer from the conduct of the various members of this family, whether closely or distantly related to Egbert, the general qualities of the house to which he belonged. The picture is not a pleasant one. The only good qualities shown by the family seem to have been those of a military kind. Murder, rapine, treachery, and brutality were poorly compensated by fierce and stubborn courage in the field, or by stern energy in maintaining discipline among scarcely subordinate chiefs.

With Egbert, son of Alcmund or Ethelmund, commonly called Egbert the Great, the history of England may be said to have begun. He claimed the crown of Wessex in 784, but Brihtric succeeded in driving him from England. For thirteen years, viz. from 787 to 800, he fought under Charlemagne, obtaining a knowledge of military affairs, and also of the art of government, such as none of the Saxon chiefs had hitherto possessed. In 800, on the death of Brihtric, a unanimous vote of the Witenagemot placed Egbert on the throne of Wessex. He seems to have devoted the first nine years of his reign to the consolidation of his power and the improvement of his people; but from the year 809 he pursued a career of conquest. By the year 813 he had reduced

the Britons in Devonshire and Cornwall to submission. At this time the Saxon Heptarchy had become a Triarchy, the only independent states being Wessex, Mercia, and Northumbria. Egbert does not seem to have intended to extend his dominion over either of the two latter kingdoms. At any rate, the contest between Wessex and Mercia seems to have been provoked by the Mercians, though, according to another account, the East Angles induced Egbert to make war on Mercia. In the contest which ensued, in 823, Beornwulf of Mercia was severely defeated, and Egbert seized Kent and Essex, which had become dependencies of Mercia. Four years later, when Mercia had been still further weakened by contests with East Anglia (Norfolk and Suffolk), Egbert reduced both Mercia and East Anglia, thus extending his kingdom to Wales on the west, and on the north to Northumbria, the southern limits of which were nearly the same as those of our present Lancashire and Yorkshire. In 828 the Northumbrians acknowledged Egbert for their lord. He then directed his arms against North Wales, which he overran, occupying even the Isle of Anglesea. He was now master of the greater part of England. He was appointed Bretwalda, and, though he does not appear to have been formally crowned king of England, he may fairly be regarded as founder of the British monarchy. He reigned till 836; and though he underwent some severe reverses from the Danes in the latter part of his reign, yet at the battle of Hengstone Hill, in 835,

he inflicted a bloody and decisive defeat upon the invaders, bringing thus to a fortunate end a long and successful reign. So far as kingly virtues (which are somewhat of the nature of glorious vices) are concerned, Egbert was an ancestor of whom the present royal family of Great Britain may fairly be proud.

His son Ethelwulf, although described by Malmesbury as a prince of small abilities, seems, from the accounts of annalists more nearly contemporaneous, to have possessed courage and energy. He had to contend against very serious difficulties, for the Northmen now made incessant attacks upon England. These were opposed with considerable success, and between 841 and 851 the Danes seem to have been disheartened by the vigorous resistance of the Saxons. In 851 they made a concerted series of attacks, which were so successfully met, that that year was long after known as "the fortunate year."

We need not specially consider here the character of the three elder of the legitimate sons of Ethelwulf, as they left no children. Still, the quality of the race is to some degree indicated by the different characters of these sons.

Ethelbald, the eldest, was of insatiable ambition and impetuous passions. During his father's absence from England he endeavoured to seize the throne,—but, on Ethelwulf's return, would have been obliged to submit, had not Ethelwulf arranged a division of the kingdom. On the death of Ethelwulf, Ethelbald

married his step-mother Judith; but overawed by the remonstrances of Swithin, Bishop of Winchester, he consented to separate from her. This lady is directly connected with our subject, by the way; for, having returned to the Court of her father, Charles of France, she presently eloped with Baldwin, his chief forester, whom she subsequently married, and from this alliance descended Matilda of Flanders, wife of William I., and great-grandmother of the first of the Plantagenet kings.

Ethelbert, like Ethelbald, was credited by the early chroniclers with great martial virtues; but we know of little that either achieved in war. Northumbria was in these reigns again an independent kingdom. The Northumbrian prince Ælla brought the whole nation into danger by his cruelty to Ragmar Lodbrog, the Danish sea-king. Having defeated Ragmar and taken him prisoner, he caused him to be devoured by snakes. Two of Ragmar's sons, Ubbo and Inguar, invaded England in the reign of Ethelred, the third of Ethelwulf's sons, slew Osbert in battle, captured Ælla and killed him with torture, and gradually extended their invasions southwards. Ethelred showed great unreadiness and carelessness in the earlier stages of the invasion, but eventually faced the Danes with sufficient resolution. He was unsuccessful, however, sustaining a severe defeat in the battle of Morten, where he was mortally wounded.

Alfred, the youngest and best loved of Ethelwulf's sons, succeeded to the throne of Wessex and the

suzerainty (to use the word of later date) of England on March 23, 871. The history of his reign is too well known to need to be repeated here. Although probably the good qualities of the king have been considerably exaggerated, there can be no doubt that he was an able monarch, and, for his time, a virtuous man. Ambition, which in his brother Ethelbald was mere greed of power, showed itself in Alfred in nobler guise. From his boyhood upwards he was emulous of praise. He seems to have been a "maternal son," or, in simple phrase, to have "taken after" his mother, Osburga, daughter of Oslac. That this was so, is rendered probable by Ethelwulf's special love for him; for it is commonly seen that a father prefers those of his children who least resemble himself. But we may recognise also in the special tastes of Alfred, and in what little we know of Osburga, a resemblance between mother and son in disposition. Osburga was not of noble birth, though her father, Oslac, who was Ethelwulf's butler, claimed descent from renowned Gothic progenitors, and was raised by Ethelwulf to the rank of earl. Alfred's administrative ability, as well as his courage and energy, are shown by the complete success which he attained over the Danes n less than ten years. For they were strongly established in England when he came to the throne, and their numbers and means were increasing during the whole period of Alfred's reign, as was clearly shown by the success of their invasions elsewhere. Against Alfred must be recorded, first, the circum-

stance that until his thirtieth year he was immoral and despotic. He himself attributed the disasters which befell him in the eighth year of his reign to these faults. He does not seem to have duly regarded the claims of his cousin Ethelwald, son of Ethelred, to power. According to our present system of succession Ethelwald should have been king, but the Witenagemot had the right to make selection among the nearest of kin to Egbert. On the death of Alfred, Ethelwald opposed Edward, Alfred's son, but was killed in battle.

Edward showed greater military skill than his father, and obtained more durable success over the Danes. But in other respects he was far inferior to Alfred. His eldest son, Athelstan, was the first who ever bore the title of King of England, for Ethelwulf and his three elder sons had been content to be called kings of Wessex, while Alfred and Edward claimed no higher title than Kings of the Anglo-Saxons. Athelstan called himself King of the English, and sometimes King of All Britain. He was, on the whole, the best of the Saxon monarchs; in fact, if the accounts of contemporary historians can be trusted, he possessed in high degree not only all kingly virtues, but many of the qualities which specially adorn private life. His mother was of humble birth, the daughter of a Saxon husbandman. He was of doubtful legitimacy, and no son of his succeeded him.

Edmund I., son of Edward by his third wife, Edgiva, reigned only from 941 to 946. He was

called the Magnificent, and was a brave, energetic, and, on the whole, successful monarch.

Edmund's son Edgar reigned after Edred, Edmund's brother, and Edwy, Edmund's eldest son. He was called the Peaceful, no war occurring during the sixteen years of his reign. But he was no coward, though small in stature. When Kenneth, king of the Scots, ridiculed his spare figure, saying it was a disgrace to the stalwart Saxon chiefs to be commanded by a dwarf, Edgar challenged him to single combat. If the chroniclers spoke truly of him, he was among the worthiest of England's kings. "There was no fleet so proud," say they, "there was no host so strong, as to seek food in England while this noble king ruled the kingdom. He reared up God's honour, he loved God's law, he preserved the people's peace—the best of all the kings that were before in the memory of man. And God was his helper; and kings and earls bowed to him, and they obeyed his will; and without battle he ruled all as he willed." Yet most certainly he was not faultless as a man. The story of his marriage with Elfrida, after murdering Ethelwold, is probably untrue, though of the wickedness and ambition of Elfrida herself there can be no doubt. But the story of his conduct to Wulfrith, a young Saxon lady, who tried to escape him under the guise of a nun, and who bore him a daughter—Editha, afterwards Abbess of Wilton—is well authenticated. He submitted to seven years' penance for this offence.

Edgar's eldest son, Edward II., was killed by his

stepmother Elfrida, that her son Ethelred might inherit the throne. Ethelred was but ten years of age when Edward was murdered. He wept when he heard of his brother's death, for which his mother, Elfrida, punished him severely, deeming his tears a reproach to herself. A few years later, this ancestress of the present royal family retired to a convent, where she bewailed her sins so conspicuously, that many doubted the reality of her repentance. Ethelred, surnamed the Unready, was fond of pleasure, idle, and careless of his subjects' interests. His reign, which lasted thirty-eight years, was one of the most unfortunate in the annals of this country. The Danes completely overran England, and London, only, remained uncaptured.

The reign of Ethelred's son, Edmund Ironside, only lasted seven months. It was a mere struggle for existence. He fought five battles, and at one time it seemed as though by his courage and energy he would have retrieved the fortunes of England. But in the fatal battle of Assington almost the whole of the West Saxon nobility fell, and Edmund was compelled to yield. He only survived his submission one month. It should be mentioned that his legitimacy was doubtful—the only flaw, so far as is known, in the Saxon line of descent from Egbert to Victoria.

From 1017 to 1042, Danish kings ruled over England. But in the last-named year Edward was king, son of Ethelred the Unready, the elder of the two born to him by his second wife, Emma, daughter

of Richard I. of Normandy. He was the half-brother of Hardacanute, the last of the Danish kings of England, son of Canute and Emma. We are not particularly concerned with Edward's character, as none descended from him ever reigned in England. Still, his relationship to the ancestors of the present royal family, and the circumstance that his character seems to have been derived more directly from his Saxon than from his Norman parentage, renders it desirable briefly to note his qualities. He seems to have been a kind-hearted but feeble man, superstitious and simple. He was the first of our kings who touched for scrofula, but whether he was persuaded thereto by the ignorance of others, or by his own conceit, does not clearly appear. A century after his death, Pope Alexander III. canonised him as Edward the Confessor, a circumstance which some will interpret in his favour, and others differently.

Edward, son of Edmund, should have succeeded Hardacanute. But he was in exile in Hungary, at the time of Hardacanute's death. Edward the Outlaw died before Edward the Confessor, in 1065. The last surviving male of the race of Cerdic was now Edgar the Atheling. But he was considered unworthy to succeed to the throne. He was made Earl of Oxford; and, as everyone knows, Harold the Unfortunate, son of Godwin, and in no way related by blood to the Saxon royal family, became king of England.

Edgar, though always described as of mean abilities, seems yet to have shown considerable energy in Scot-

land. Malcolm Canmore, king of Scotland, married Edgar's eldest sister, Margaret. Malcolm and his eldest son Edward were killed in battle in 1093; Margaret died three days later. Thereafter Edgar took charge of his sister's children. He first removed them to England. Donald Bane (Malcolm's brother) was defeated by Duncan, a natural son of Malcolm Canmore, but regained the throne in 1095. Two years later, however, Edgar drove Donald Bane from the throne of Scotland, and placed thereon his nephew Edgar.

Here we enter on Scottish history, and as our examination of the Norman blood royal ended with its first appearance in purely English history, so our inquiry into Saxon blood royal may conveniently end with its first appearance in Scottish history as ordinarily studied.

NATURE MYTHS IN NURSERY RHYMES.

BY THOMAS FOSTER.

Qualia prospiciens Catulus ferit æthera risu
Ipsaque trans Lunæ cornua Vacca salit.
Anon.

We have long since learned that nearly all the gods and heroes of mythology, properly so called, represent natural objects or phenomena. In some cases the names of these beings show this directly. For instance, the name Phaethon, or *glittering*, manifestly

describes the midday sun; and Endymion, which expresses the idea of *plunging into* the sea, is as manifestly an appropriate epithet for the setting sun. In other cases, though the names are not directly descriptive, they are found to be so when traced to their original source. Thus, the Erinyes would not be associated by an ancient Greek with any natural phenomenon, but are recognised by the modern philologist as the children of the dawn. In Vedic mythology, Erinys appears under the name Saranyû; and it is easy to understand how the Erinyes came to be regarded as the avengers of sin and to be specially associated with blood-guiltiness, when we consider that the light of dawn, which shows what had been concealed during the night, is usually ruddy, as if revealing the stains of blood. In other cases, while the philological evidence is less distinct, the myth itself indicates clearly the natural phenomenon from which it took its origin.

Gradually, then, ordinary natural phenomena have taken the place of the merely marvellous in the stories of Greek and Roman mythology; while the doctrine once commonly entertained, that these stories had an historic origin, has been wholly rejected. But the process has not stopped here. In fact, it scarcely began here. Stories professedly historical have come to be regarded as nature myths. Our old friends Romulus and Remus, for instance, turn out to be no more historical in reality than Robert and Richard, those "two pretty men" of the nursery rhymes. I

may remark, in passing, that as Robert and Richard lay in bed till the clock struck ten, we have *primâ facie* evidence that their story is a nature myth, belonging to latitudes where the winter sun rises at ten in the morning, and the full moon in summer rises at ten in the evening. Be this as it may, the story of Romulus and Remus is now generally recognised as mythical. It is found in the folk-lore of many nations. Müller, in his "History of Sanskrit Literature," has shown its resemblance to the myths of Cyrus and Chandragupta. In the Sclavonic myth, the super-human twins Waligora, the "mountain roller," and Wyrwidab, the "oak uprooter," are suckled respectively by a she-wolf and a she-bear. The Teutonic legend describes how Dieterich was reared by a she-wolf, and in a number of other cases we find a similar story of the exposure of children of noble birth, their rescue by a wolf or bear, and their subsequent recognition through the grace and dignity of their bearing. I need not here explain how the story is interpreted; but I may note that the animal which rears the children represents light, "offspring of heaven first born," while the children represent the sun and moon; or, if there is but one child, as in the story of Perseus, then the sun is represented. And in passing, it may be noticed how the poet, who is in his way a myth-maker, represents the sun as nourished by light. "Of light," says Milton—

> By far the greater part He took,
> Transplanted from her cloudy shrine, and placed

> In the sun's orb, made porous to receive
> And drink the liquid light, firm to retain
> Her gathered beams.

But the interpreters of myths have gone further yet. They recognise nature myths in Adam and Eve, Cain and Abel, Enoch and Lamech, and Noah. Abraham, Isaac, and Jacob have not escaped. All the patriarchs and all their wives either typify the sun, moon, and stars, or else other natural objects and phenomena, as clouds, rain, lightning, and so forth. So also with the Judges. Barak is Lightning. He is associated with Deborah, the Bee; and clearly, if rain and dew are typified—as we know they are—by honey, then the Bee must be the rain cloud. Jael also is the Wild Goat, which is another cloud symbol. The account of the death of Sisera means only in reality that he was killed by a lightning stroke. As for Samson, he is as unmistakably a sun god as Hercules, the strong man of Greek mythology, and Melkart, the Phœnician Hercules. Samson's name is manifestly derived from the Hebrew Shemesh, the sun. For it is properly Shimshôn. And precisely as we have from Dâg, a fish, the name Dag-ôn, or the fish god; so from Shemesh, the sun, we get Shemesh-ôn, or Shimshôn, the sun god. Indeed, Bertheau, in his "Buch der Richter," though he rejects this derivation, yet, in reality, gives the strongest possible evidence in its favour. For he only objects to it that the long narrative respecting Samson introduces no reference to the sun, and "we

do not expect," he adds, "to find a name of this kind anywhere in Hebrew antiquity." So soon, however, as we perceive that the story of Samson is only another form of the story of Hercules, which is certainly a solar myth, the objection is removed, and the philological evidence of Bertheau in favour of the derivation acquires so much the more weight, that he had no knowledge of the mythological evidence subsequently to be obtained. The hair of Samson represents the solar rays. Delilah is the Languishing One, and represents winter. The reader, however, who wishes to understand precisely how the story of Samson is to be explained, must be referred to Goldziher and Steinthal, who will be found to supply not one explanation only, but several. I hasten on to my own theory, which I shall hope to establish as satisfactorily as these writers have established the solar character of Samson.

It is well known that many of our nursery rhymes, like many of our nursery tales, are of extreme antiquity. I do not say that the actual verses were put into their present form at an exceedingly remote epoch. The words are doubtless modern, but the idea underlying them is often very old indeed. The antiquity of many of our nursery tales is indeed generally recognised. It begins to be seen that several, if not all of them, are nature myths. It will be well to consider a few illustrative cases, for though my own theory is not directly connected with these tales, yet it is indirectly supported by whatever tends

to indicate the connexion between nature myths and nursery legends.

The story of Cinderella, the best loved, I think, of all nursery tales, is of extreme antiquity. It is certainly a nature myth. The original story represents Cinderella as the dawn. The Prince is the sun. The ashen-grey tint of the clouds before dawn is typified in the name *Cinder*-ella, as in the German *Aschen*-puttel. The fairy is Light, which in the morning paints the ash-coloured clouds with brilliant hues. The sun follows, but as he draws near, the splendid colours disappear, and at the hour of sunrise, the mystical hour beyond which Cinderella was not to stay in the ball-room, the glory of the dawn is lost, as

> East and west without a breath
> Mix their dim lights like life and death
> To broaden into boundless day.

Yet even as the last traces of the splendour of dawn remain for a few minutes visible after sunrise, so the beautiful maiden, when pursued by the prince, leaves in her flight one trace, showing at once what had been the splendour of her magic dress and how beautiful was the maiden herself. So, at least, runs the usual explanation. But I think the glass slipper, the last trace of dawn, means rather the dew. By a poetic fiction the dewdrops of morning become the glassy traces left by rosy-footed dawn (Rhodopê). Thus the tale of Cinderella would be connected with the beautiful story of Cephalus and Procris, for Procris (Sanscrit

prush and *prish*, to sprinkle) is the dew. In the Greek, Procris is said to be the daughter of Hersé, the dew; but in the story of Cephalus and Procris, the relation between dew and the aurora is different. Cephalus, or Kephalos (the *head*), the sun, is loved by Eos, the dawn; Procris, his wife, is faithless, yet loves him; but in the end she is killed by the arrow of Cephalus unwittingly, even as dew is destroyed or absorbed by the sun's rays.

The story of Beauty and the Beast is also a nature myth. It is closely related to the Greek tale of Psyche and Cupid, or rather to the much more ancient legend on which Apuleius based that tale. The class of legends to which all those stories belong is more widely spread than perhaps any other. The myth is diffused through India, Egypt, Greece, Italy, Scandinavia, and Germany. "In each case," says Mr. Cox, "the youngest and most beautiful of three daughters is married or given up to some unsightly being or monster, or to some one whom she is led to suppose hideous and repulsive. In some instances the enchantment is ended when the human maiden feels and confesses her love for the disguised being in his unsightly shape; in the more common version, which Apuleius followed, the maiden has a lover who is marvellously beautiful, but whose beauty she has never seen. In all cases, however, there are jealous sisters, or a jealous mother, who insist that the lover is hideous, and incite her to look upon him while he is asleep. Following their advice, she disregards the warning

given, in each case, that such curiosity cannot be indulged without causing grievous disaster and distress. In each case the sleeping lover is awakened by a drop of oil or tallow from the torch or candle in the maiden's hand, and is instantly transformed, generally into a bird, who tells her she must wander in search of him through many weary years, and do the bidding of some harsh mistress, into whose power her fatal curiosity has brought her. In some versions, as in that of Apuleius, this mistress is the mother of the lost lover. Then follow the years of wandering and toil, which can be brought to an end only by the achievement of tasks, generally three in number, and all utterly beyond human powers. In these tasks the maiden is aided by brute creatures whom she has befriended in their moments of need, and who perform for her that which she could not possibly accomplish herself. The completion of the ordeal is followed by the happy union of the maiden with the lost lover."

There is a good deal here which does not appear in the story of Beauty and the Beast, as told in our nursery books. But there can be no question about the relationship between all the stories, for they can be so arranged in graduated sequence as to form a complete series, the first differing widely from the last, but each of the series closely resembling those next to it on either side. In the Hindu story, the heroine, not the hero, undergoes change. She is a princess who is disguised in the skin of a withered old woman, which she removes before dawn, but resumes

when day has broken. This story connects the series with the tale of Cinderella. Psyche is the dawn, wedded to the sun, with whom the story imagines her to stay during the night. But she does not see him in his glory, for with sunrise the dawn vanishes.

The story of St. George and the Dragon is merely the Christianised form of a very ancient and widespread myth. Among all the Aryan nations we find this story of a hero contending with a monster. The Vedic mythology describes the combat between Indra and the dragon Vritra. The name Vritra signifies one who hides or veils, and is closely related to the Greek Orthros, or Cerberus. Vritra is sometimes called Ahi, the great serpent or throttler; sometimes Pânis, a name indicating darkness or gloom. The battle between Indra and Vritra was a contest between the sun and the dark thundercloud in which the rain is imprisoned. When the spear of Indra—the lightning flash—pierces the cloud, the rain is released. Later, the physical myth assumed in India, as with the Hebrews, a moral form. Vritra became the evil one, the enemy, just as the "old dragon" became Satan, the adversary. In Greek mythology the story of Indra and Vritra appears in many forms—in the contest between Hercules and Geryon, and again in the contest between Hercules and Cacus; in the stories of Perseus and Andromeda, of Œdipus and the Sphinx, and several others. In Norse legend the story reappears in the combat between Sigurd and the dragon Fafnir. Nor is

Christian legend satisfied with one form of the myth; for, to say nothing of the contest with the serpent in Paradise, we find not only St. George but the Archangel Michael in conflict with the dragon.[1]

I trust the reader will find all this perfectly clear and satisfactory. For my own part, I am particularly impressed by the diversity of form which these myths assume. It seems to me that it would be very unreasonable to deny the validity of interpretations which account for so many things in so many different ways. Some, at least, among these interpretations must satisfy even the most captious. For instance, to return to Hebrew mythology, as explained by Goldziher, when we learn that the name Adam is "obviously at a glance a solar appellation, 'the Red,' etymologically the same as Edom," we perceive that Adam must represent the sun. When we have admitted this, it is most satisfactory to learn that even if this fail us (for Max Müller, after all, insists that Adam represents not the sun but the earth), the name Eve, Chawwâ, that is, the "Circulating," is also a name of the sun.

[1] The story of Indra and Vritra is one which lends itself very readily to the allegorist. The reader will probably remember Sydney Smith's amusing allegory on reform (Taunton speech, 1832):—"Two thousand years hence it will be a legend, like the fable of Perseus and Andromeda: Britannia chained to a mountain, two hundred rotten animals meditating her destruction, till a tall earl, armed with Schedule A, and followed by his page, Russell, drives them into the deep, and delivers over Britannia in safety to crowds of ten-pound renters, who deafen the air with their acclamations. Forthwith Latin verses upon this—school exercises—boys whipped, and all the usual absurdities of education."

For, as Goldziher expounds, "'the Round' is a very ancient appellation of the sun, the traces of which we meet also in the Vedas, where the sun is called a wheel, or, as he frequently is in other passages, a chariot"; which simile, we learn further, "is based not only on the conception of the horses of the sun drawing his chariot, but on the original conception of this chariot, as consisting of a single wheel, or of a cylinder on a sloping plane, as Lazarus Geiger has admirably demonstrated." This is touchingly simple and natural. But even this is not all. "It is also to be considered that the mythological genealogy of the Hebrews makes the world to be peopled by the descendants of Cain, children of the sun, and that a second progenitor of the human race, Noah, is likewise a solar figure." And so onwards to Samson and David. For even David, though certainly in one sense historic, is in another sense "a solar figure." "He was ruddy, with beautiful eyes, and a good sight"; and the red colour is admirably fitted to figures of the solar myth, whereas, as Goldziher astutely remarks, "it cannot be proved that the Hebrews in ancient times considered reddishness an element of beauty." So "the beautiful eyes and the good sight are certainly taken from the mythical description of the blazing midday sun. They are the relics of a mythic cycle only preserved in fragments, and have been tacked on to the portraiture of an historical hero, who had, like the solar hero, to fight with a hostile giant." Besides, David threw stones,

and Goldziher points out that "taking the life of a *giant* adversary by *hurling stones*" is a line of action frequently met with among solar heroes.

Fortified by examples such as these, I proceed to point out a number of circumstances hitherto, I believe, overlooked, which show that not only, as has been clearly shown above, are nursery legends chiefly myths, but that the nursery rhymes which beguile the happy hours of British infancy (and European infancy generally) had their origin in various nature myths, and especially in solar myths. I make no doubt that in several instances these rhymes have been largely altered. Erroneous readings, if one may so speak of oral renderings, have crept in during the course of ages. Names whose real significance has been forgotten, have been changed into others, phonetically similar, but in reality altogether distinct. Just as the seven *Rikshas* or *Shiners*—the seven stars of the Great Bear—came to be called in Sanskrit mythology the seven *Rishis* or *Sages* (which is absurd), and as the same seven stars, which had been called the seven *târâs* or *strewers of light*, were converted into the seven *triones* or *ploughing oxen* (which is equally absurd); or as, to take more modern instances, the *buffetiers*, or sideboard men, became changed into *beefeaters*, and the *Satyr and the Bacchanals* into *Satan and the Bag o' Nails*—so various names in our nursery rhymes are now either meaningless or have assumed a form in which their old meaning is lost. But in many cases there has been less

change than the students of Greek and Hebrew mythology recognise in narratives whose present form dates from a far higher antiquity.

I have already touched on the simple story of Robert and Richard. That a nature myth is presented in this story can hardly be doubted. We have direct reference (which is often wanting in Vedic and Greek mythology) to a contest between night and the sun. The contest ends, we may assume, in the triumph of the sun. I am disposed to believe that the true interpretation of this most interesting legend may not be that suggested (passingly) above. The late hour at which the sun manifests his power may be ascribed to the action of Vritra, the Veiler. In other words, we have in this legend a description of the sun god struggling with the gloomy powers of the cloud, which, be it noted, is not unusual in our latitudes. In illustration of this theory I would point out, with Goldziher, that the battle of day with night is very frequently represented as a quarrel between brothers. (We cannot doubt that Robert and Richard were brothers, though the circumstance is not mentioned; in fact, they were probably twin brothers; for it is certain that the modern names have taken the place of the older ones, and what can be more natural than to assume that Robert and Richard represent in reality the mythical heroes, Romulus and Remus?) The brothers' quarrel, which appears at the very threshold of Biblical history, had for its source, says Goldziher, "the nature myth spread among all nations

of the world without exception. It is not difficult to prove that Cain (Kayin) is a solar figure, and that Abel (Hebbel) is connected with the sky, dark with night or clouds." Cain is an agriculturist, Abel a shepherd, and it has been proved that "agriculture always has a solar character, whereas the shepherd's life is connected with the phenomena of the clouds or nightly sky." Our British legend is silent as to the occupations pursued by Robert and Richard, but doubtless if a fuller record had been left it would have appeared that one tilled the fields, while the other tended herds.

The next legend of the nursery to which I would call attention is that which begins "Sing a song o' sixpence." Here I have been to some degree anticipated by the ingenious and learned author of "Primitive Culture." "Obviously," he says, though I regret to say he is talking lightly and means the reverse, "the four-and-twenty blackbirds are the four-and-twenty hours, and the pie that holds them is the underlying earth covered with the overarching sky. How true a touch of nature it is," he proceeds, "that when the pie is opened, that is, when day breaks, the birds begin to sing. The king is the sun, and his counting his money is pouring out the sunshine, the golden shower of Danaë. The queen is the moon, and her transparent honey the moonlight. The maid is the rosy-fingered dawn, who rises before the sun, her master, and hangs out the clouds, her clothes, across the sky. The particular blackbird who so

tragically ends the tale by snipping off her nose, is the hour of sunrise." Here the details of the story are not so closely followed as they might be. But even this interpretation, imperfect though it be, is infinitely preferable to one which has been suggested in recent times. According to this, the four-and-twenty blackbirds baked in a pie are four-and-twenty black numerals baked into the glazed face of an old-fashioned clock, showing twenty-four hours instead of twelve, like our modern clocks; the king is the crown-wheel, the teeth of which count out as it were the beats of the pendulum, representing the progress of time (which we know is money); the queen is the large lower wheel; the honey is the oil; the maid is the cord bearing the clock weights, and so forth. This interpretation would make a mere riddle of the rhyme, and must at once be rejected as unworthy of credence. Apart from other objections which might be urged, the opening lines of the song, manifestly intended to convey the purport of the whole, have no relation whatever to a clock. It is strange that Mr. Tylor should have overlooked them. "Sing a song o' sixpence, a pocket full o' rye." Manifestly we have here an invocation—"Sing muse," or perhaps, "Let the worshippers of the sun sing in his praise a song showing how wealth and plenty proceed from him"—wealth typified by coined money, plenty by a sack of rye. For the word pocket, still used in Kent to represent a sack, was of old used generally in that sense, as in our own familiar proverb, "Buy a pig in a poke," or pocket; that is

concealed within a sack. Accordingly the song proceeds to describe how the sun generates wealth, or counts out money, by his genial rays. We may interpret the rest as Tylor suggests, except that the maid hanging out the clothes may more correctly be regarded as representing the moisture of the fields and plains, from which clouds rise in the daytime, like clothes suspended in a garden. According to this view the blackbird which brought the maid's operations to a close would not typify the hour of sunrise but of sunset, when clouds cease to form in this way (though they do not necessarily disappear).

We have seen that this mythical poem has been explained as relating to a time-piece or clock. Others have been similarly interpreted. One, indeed, which is manifestly of recent origin, has been correctly interpreted, I think, in this way. Unquestionably, the lines beginning "Hickory, dickory, dock," describe, in a poetic way, the action of an old-fashioned clock when about to strike and while striking. "Hickory, dickory, dock" is the noise made in "warning," as it is called, and the same noise is repeated when the clock is actually striking. The old "striking-plate" clocks are common enough still to make this noise familiar to most persons. In the "rack-and snail" striking-clocks no such noises are heard. The mouse is a poetic fiction. We can find no evidence, though possibly Mr. Goldziher might, of any solar figure or other nature myth in this simple narrative.

But I would caution the reader against the clock

theory as applied to other cases. For instance, the legend of little Jack Horner has been most incorrectly interpreted as relating to a clock, with hands of horn, set in the corner of a room. Little Jack, according to this theory, is the hour-hand; his eating the Christmas pie denotes the progress of this hand round the face of the dial (a pie, as in the clock theory of the Song of Sixpence); his putting in his thumb, &c., means the hour-hand reaching one of the numerals; while his song of self-praise represents the striking of the clock at the moment when the hour-hand is thus situated.

All this is ingenious, but it is altogether fallacious. Jack Horner is unquestionably a solar figure. We shall see presently that the name Jack in British nursery lore is a recognised name for the sun, though of course not the only name, any more than Samson is the only Hebrew name for the sun god, or Heracles the only Greek name. Horns have long been associated with the sun's rays. The same Hebrew word which denotes *horn* (keren) signifies also *a ray of light*. In fact, the words which in our Bible are translated, "Moses wist not that his face shone," are translated in the Douay version, "he knew not that his face was horned." (Michael Angelo's Moses is sculptured with horns, just as Bacchus used to be.)

[1] The history of Bacchus, as Huet points out, is not unlike that of Moses. He was born on the confines of Egypt; was exposed to the waters in a box; was adopted, or had, in a sense, two mothers; and was very handsome. When his army was in the

Steinthal has shown conclusively that Moses, though an historical personage, has received many features of the solar myth. I may note also that the glyptic picture of the God Bel at the Louvre is adorned with a tiara surrounded by a row of horns.

Little Jack Horner, then, is the sun god, small compared with the sky, or else described as little because young, for the season is Christmas-time, or winter. He is not yet horned, but putting on his horns, that is, he is on the horizon or about to rise, and is spreading forth his first rays. He is aptly described, therefore, as seated in a corner. The small sun on the horizon eats away the clouds which cover the winter sky. He puts in his thumb (the thumb being a recognised emblem of strength), that is, he shines on the cloud masses and dissipates them one by one. They are poetically represented as forming the ingredients of the Christmas pie, as clouds form the winter covering of the sky at sunrise. In the Edda the point of the horn of Heimdall (the sun) is fixed in Niflheim (the cloud-home). Then, as the rays

light, his Indian enemies were in darkness. A pillar preceded him, women followed in his train, he dried up rivers with his wand or *thyrsus*, which he made to crawl like a serpent. Epiphanius says the Idumeans worshipped Moses. Josephus says their God was called Chose, probably identical with Chus, the ancestor of Sephora. Bacchus or Iacchus may be Jah-chus, or the God Chus. Moses and Bacchus are probably the same persons. Others, however, consider the name Iacchus to be derived from the Greek *ἰαχεῖν*, to shout. Possibly we have here the origin of our English use of the name Jack for the sun.

break through, the sun is represented as glorying in his might. The shout of self-praise manifestly represents the bursting forth of the sun's rays. The connexion between shouting, especially shouting in triumph, and brightness is very ancient. The Hebrew "sahal" means both "to shine brightly" and "to cry aloud." Hillêl, also, which means "to cry out in triumph," originally meant "to be brilliant," as we see by the names hêlêl, the Hebrew for morning star, and hilâl, the Arabic for new moon. (See also the last two sentences of the preceding note.)

I have said that Jack is a common name, in British folk-lore, for the sun. We see this in the story of Jack the Giant-Killer, the British Hercules, or sun god, whose contests with giants, and victories over them, correspond to the contests of Hercules with Geryon, Cacus, and the rest. The story of Jack and the Beanstalk, again, is obviously a sun myth, the magic beanstalk representing the sun's rays, extending swiftly athwart the sky and reaching even to the moon, round whose horns they are poetically pictured as clinging. Whether there is any connexion between the name Jack, as thus used, and the Greek Iacchus (see preceding note) is not clear, but that Jack in the older British nursery rhymes and legends represents the sun, cannot be seriously questioned.

In the story of Jack and Jill we recognise a myth of the sun and moon. The sun and moon (the moon new, or following the sun) go up a hill. We have

already seen that according to Lazarus Geiger the sun was often conceived as a cylinder, on a sloping plane, first an ascending then a descending plane. In the story of Jack and Jill the cylinder does not appear, unless it is represented by Jack's pail; but the hill manifestly represents the path, first ascending and then descending, followed by the two luminaries. The action of the sun in raising water, is obviously typified by the use of the pail to fetch water. It will be observed that there is only one pail—the myth-maker knew well that the moon is not able to raise water, as some modern meteorologists have mistakenly opined. The sun, having passed the summit of the hill, descends to the west, his crown of glory being divided when he reaches the horizon. The new moon follows, but as she is so much less brilliant, the myth says nothing of the loss of a portion of her radiance as she sets. All this is well presented in the nursery rhyme. It is hardly necessary to point out, perhaps, that a sequent verse relating to the tending of Jack by his mother, though it might be regarded as indicating the restoration of the sun's glory in the morning (night being typified by Dame Gill), is in reality a modern addition and altogether spurious.

Two riddling rhymes may be mentioned here, which in reality both relate to the sun, though one has been foolishly explained as signifying an egg—the lines relating to Humpty Dumpty and Hickamore-Hackamore. These manifestly form a single riddle, which should run thus—

Hickamore-Hackamore, on the king's kitchen floor,
All the king's horses and all the king's men
Can't drive H.H. off the king's kitchen floor.

Humpty Dumpty sat on a wall, Humpty Dumpty got a great fall,
All the king's horses and all the king's men
Can't set Humpty Dumpty up again.

Even the infantile mind rejects the common explanation of Humpty Dumpty inquiring why an egg should be set on a wall of all places in the world, and what interest a king could possibly have in employing men and horses to mend a broken egg. But as a sun myth all is clear. An Irish lady informs me, moreover, that the usual explanation of Humpty Dumpty among children in Ireland is, that he represents the sun. We have in Hickamore-Hackamore the midday sun, the power of whose rays is aptly indicated by the reference to the king's horses and men. In Humpty Dumpty we have the setting sun, compressed vertically, as the setting sun always is, by atmospheric refraction[1] (egg-shaped, in fact, whence possibly the common explanation, a corruption of some reference to the egg-shaped setting sun). He sinks, and again we have words aptly describing the irresistible operation of natural laws. All the king's horses and all the king's men cannot make the sun rise in the west after he has set.

[1] There may also be some association between the word Dumpty or Dumpkin, as in another rhyme presently to be dealt with, and δῦμι, a collateral form of δύω, to enter or sink into, as in En-dymion, the setting sun.

I must hasten on, for space begins to fail me. Fain would I give the full interpretation of the mysterious legend relating to the House that Jack Built. Readily would I describe how the story of the Old Woman who feared lest the obstinacy of her pig would prevent her reaching home before nightfall, presents a nature myth of deep and solemn import.[1] But I must content myself at present with the consideration of two nursery rhymes which can be dealt with in shorter space than those more elaborate and more mystical compositions.

[1] It will aid the student of this interesting subject to present the Jewish form of this nature myth: It is known, Tylor says, as Chad gadyâ. It begins, "A kid, a kid, my father bought for two pieces of money," and it goes on to tell how a cat came and ate the kid, and a dog came and bit the cat, and so on to the end. "Then came the Holy One, blessed be He! and slew the angel of death, who slew the butcher, who killed the ox, that drank the water, that quenched the fire, that burnt the stick, that beat the dog, that bit the cat, that ate the kid, that my father bought for two pieces of money, a kid, a kid." I would, however, warn the reader against attaching to this poem any such limited, and, as one may say, parochial interpretation as the Jews themselves assign to it, who (according to one explanation) consider Palestine the kid, devoured by Babylon, the cat; Babylon is overthrown by Persia, Persia by Greece, Greece by Rome, Rome by the Turks; but the natives of Europe are to drive out the Turks, the Angel of Death is to destroy the enemies of Israel, and his children are to be restored under the rule of Messiah. But as Tylor (from whose book I have taken this interpretation), remarks justly, "independently of any such particular interpretation, the solemnity of the ending may incline us to think that we really have the composition here in something like its first form, and that it was written to convey a mystic meaning.

The first of these has already received some attention from antiquarians. Sir G. Cornewall Lewis has treated HEYDIDDLEDIDDLETHECATANDTHEFIDDLE, &c., "as an Oscan inscription," says Professor De Morgan, and rendered it into Latin by approved methods. The result is an invocation beginning "Hejus dedit libenter, dedit libenter," &c. Without denying the possibility, or even the probability, that the opening words of the composition may be thus interpreted, I would point out that the poem, as a whole, is undoubtedly a nature myth, though its real significance may not now be fully recoverable. The words, "Hey diddle diddle," are of course a corruption of some introductory invocation, just as our familiar expression, "Hocus-pocus" is a corruption of the words *Hoc est corpus*, &c., which the priest utters over the sacred elements at mass. It may be that Sir G. C. Lewis correctly caught their meaning. I would suggest, however, that the name given to the sun in the verses beginning "Hickamore-Hackamore," being presumably Hick or Hack (the adjunct "amore" being simply intensative), we may perhaps read *Hick* (*vel Hack*) *dedit libenter, dedit libenter*,—that is, the sun (Jack) has bestowed plenteously, most plenteously. It is noteworthy that the mystic words "diddle diddle" occur, very little modified in form, in the verse beginning, "Deedle deedle Dumpkin, my son John." Here John or Jack is, as elsewhere, a solar figure. Dumpkin or Dumpty, we have already seen, is a title of the setting sun (the sun's retirement clothed in clouds is manifestly

referred to in the next line, which tells us that John "went to bed with his breeches on"). Of course "my son" is a corruption of "our Sun," so that the words would be naturally interpreted "*Dedit libenter, dedit libenter*—Dumpkin, our God the Sun": that is, "The Sun which has just set, clothed in clouds, has poured his rays plenteously on the earth during the day."

This seems to establish unmistakably the reading above suggested for Hey diddle diddle. The Cat and the Fiddle are no doubt constellations, possibly the Lion and the Lyre, the first being the zodiacal sign in which the sun was situate at the season referred to in the poem, the second being probably on the meridian at the hour of invocation. The "cow jumped over the moon" indicates that the moon (which must have been about as far south of the ecliptic as she ever is) was below the constellation Taurus, which, being one of the half-constellations, is of doubtful gender. Ovid, indeed, by making this zodiacal figure a transformation of Io, shows that it might be regarded as a female. Admiral Smyth remarks on this, in his excellent astronomical treatise, the "Celestial Cycle," that the classical astronomers are very weak in their mythological derivations and zodiacal signs. It must be remembered that if the initiatory invocation is rightly interpreted by the Latin words given above, we must have received this mystical poem from a Roman source. The "little dog laughed" means simply that at the season in question

Canis Minor was resplendent—not during the night though, for if the sun was in Leo that could not be. The stars were always supposed to exert their chief influence, however, when above the horizon at the same time as the sun. The dog-days, for example, were days when Sirius was invisible at night. Laughing is always to be understood, in myths, as signifying brightness (see Angelo de Gubernatis, "Zoological Mythology," vol. I. i. 1). Isaac, who is of course a solar figure, was called The Laugher, Yischûk (Genesis, chap. xxi. verse 6); and to represent the brightness of the sun, the Indians called the rising sun, or the dawn, Ushas the *Smiling* (Rigveda, vi. 64, 10) for a similar reason. So the stars were called *smilers*, as in "Abû-l-Alû's poems, in the line—"Watabtasimu-l-ashrâtu fajran"; and lightning is called in Arabic "Al-dâhik," *The Laughing One*. "The dish ran after the spoon" indicates the relative position of the sun, represented by a circular disc or dish, and the moon, represented by a spoon. The sun being in Leo and the moon in Taurus, the moon was three signs in front of the sun (referring to the diurnal motion). Thus the moon would be in her third quarter, or spoon-shaped, and the sun would run after her across the sky, instead of preceding her, as in the case referred to in the myth of Jack and Jill.

Thus we see the poem "Hey diddle diddle" satisfactorily explained. It signifies, "The midday sun, Hack, has been bountiful; the sun is now in Leo, Lyra on the meridian; the rays of Procyon in Canis

Minor are active; the sun's disc follows the spoon-shaped moon in their diurnal motion across the sky." Manifestly the verse is either incomplete and merely introductory to a descriptive poem, or else it relates to some unknown but assuredly most solemn rites, its full meaning being understood only by the initiated, and lost to us.

The only remaining nursery rhyme to which I desire to call attention is one which many would be disposed to regard as altogether meaningless. I refer to the lines beginning—

Tom, Tom, the piper's son.

I think I shall be able to show that these lines are even more unmistakably mythical than the rest, if that be possible.

In the first place, it is to be noted that we have in this poem the story of theft, at first successful, but presently followed by punishment, which forms the basis of so many of the native myths of Assyria, India, Egypt, and Greece. We also have in this legend evidence which is wanting elsewhere, in the descriptive name applied to the progenitor of the thief—the Piper, a name which manifestly signifies the Wind. In the poem relating to Taffy, absurdly supposed to signify Tavy, a Welshman, we have the thief, but no mention is made of his origin. In the name Taffy, however, we have evidently the root *tuph*, signifying concealment, as in the Greek verbs *τύφω, to raise a smoke,* and *τυφόω, to wrap in smoke,* and in the names of the giants Typhon, Typhaon, and of the

Egyptian god Typhon. This root is connected with the idea of storm, as in fact is shown by the now familiar name "typhoon" for a hurricane. In the lines beginning "Tom, Tom, the piper's son," we have the relationship between Tom the thief and the storm wind directly indicated. We cannot doubt, then, that Tom and Taffy, or Typhon, are related, though at first sight the difference of names may seem to suggest a difficulty.

It may be noticed in passing that, according to Greek mythology, Typhon waged war on Jupiter (who represents the sky), and taking him prisoner in battle, "carried him away on his shoulders into a remote and obscure quarter." (I follow Bacon's version of the story, because, as he interprets it allegorically, not mythically, he will be the less likely to give an account favourable to the theory I am about to advocate.) "There, cutting out the sinews of his hands and feet, he bore them off, leaving Jupiter behind miserably maimed and mangled. But Mercury afterwards stole these sinews from Typhon, and restored them to Jupiter. Hence, recovering his strength, Jupiter again pursues the monster; first wounds him with a stroke of his thunder, when serpents arose from the blood of the wound; and now, the monster being dismayed and taking to flight, Jupiter next dashed Mount Ætna upon him and crushed him with its weight." Now, this story is the same which in the older Egyptian mythology is related of Typhon and Osiris. But the Egyptian story is fuller of detail and

more obviously a nature myth. "Against the mighty and benevolent power of Osiris," we read, "Typhon, the evil principle, conspired, secretly assailed and overcame him; the spirit of Osiris descended to the shades below, and his body was hewn to pieces by his ruthless murderer and scattered to the winds. Thus Typhon, the evil principle, became the presiding genius of the earth. During his reign nature lost all her beauty; the withered foliage dropped from the trees, the Nile dwindled to a small stream, and the winds of the south whirled the noxious sand of the Libyan desert over the whole land, making the earth barren and desolate; pestilential vapours arose from the surface of the ground, and the fields swarmed with serpents and scorpions and all noxious animals. Meanwhile Isis, with a wife's affectionate care, gathered the fragments of her lord's murdered body, and arranged them together. Soon after, Osiris returned from the subterranean realms, vanquished Typhon, and again restored the earth to beauty and fertility. It is important to notice that this conflict between the powers of good and evil was a yearly event, and solemnised as such."

It may appear, perhaps, at first sight, rather bold to assume that Tom the Piper's son is necessarily Typhon, the storm-cloud, child of the hurricane, the physical representative of darkness and the power of evil. But I would note that in all the nursery rhymes we find the name Tom connected with darkness and mischief. Thus, little Tommy Tucker sings for his

supper, that is, at nightfall. (The rest of the song relating to him is evidently a nature-riddle—the white bread and butter, like the bread and honey eaten by the queen in the Song of Sixpence, being moonlight.) The drowning of pussy in the well—the cat being the Egyptian Bubastis, emblem of the moon—is effected by Tommy Green,[1] while her restoration, or the removal of the clouds which had enshrouded the moon, is effected by Jack Grout, probably Jack Roth, or Red Jack, the sun. Tom Tiddler, also, on whose ground (the night sky) gold and silver (the stars) are picked up, is a representative of darkness; for the games of children, as Tylor well remarks, are survivals of occupations formerly belonging to the serious business of life.

The origin of this usage of the name Tom is not clear, any more indeed than the origin of the usage which assigns the name Jack to solar figures. But it may be suggested that the name Thammuz has perhaps been turned into the familiar Thomas. The name of the Phœnician deity Thammuz, like the name Typhon, implies *concealment*. Indeed, what is known

[1] It is well remarked by Goldziher that the blackness of night is not "separated from the general category of *dark colour* to which green and blue also belong." He quotes the words of an explorer sent out from the land of Banû Madhij to look for suitable pasturage, who said, "The surface of the land is *like night*, so *green* is it. So also Abû Nucheylâ (Agâni, xviii. 139) says, "Put on as thy shirt, night, black and dark like the colour of *sundus*," this being the greenish colour of the garments promised the faithful in Paradise (Koran, Sûra xviii. 30, lxxvi. 21).

about the deity Thammuz resembles in many respects the legend or myth of Typhon. Thammuz is identified with the Greek Adonis. The women who sat weeping for the death of Thammuz (Ezekiel viii. 13) are described in the Septuagint as weeping for the death of Adonis. The reader will remember how Milton ("Paradise Lost," i. 146) speaks of the rites of Thammuz,[1]—

> Thammuz came next behind,
> Whose annual wound in Lebanon allured
> The Syrian damsels to lament his fate
> In amorous ditties all a summer's day,
> While smooth Adonis, from his native rock,
> Ran purple to the sea, supposed with blood
> Of Thammuz, yearly wounded.

It is hardly necessary to remind the reader that as Tom the Piper's son was beaten for pig-stealing, so Thammuz, or Adonis, was wounded in a boar hunt. According to the Greeks, indeed, Adonis was slain, but he was to be perennially restored.

But it may be asked, do we know anything respecting Adonis or Thammuz which would correspond to the relation between Tom and the Piper? Was Adonis, according to classic mythology, the son of the storm, or of the Piping One? The answer seems to me decisive in favour of the interpretation which I have assigned to this nursery legend. Adonis was the son of Kinyras and Myrrha, Myrrha being also his

[1] At a recent meeting of the Congress of Orientalists at San Mezzano, Professor Lenormant read an interesting paper on the evidence obtained from the cuneiform inscriptions respecting the myth and festivals of this God Tammuz, or Thammuz.

sister. Whenever, by the way, we meet with complex relationship of this sort, we may be sure we have a nature myth to deal with. In this case Kinyras (the storm) begets Myrrha (the rain), and Adonis (the storm-cloud) is in turn poetically represented as the offspring of storm and rain. I consider Myrrha to represent rain, because the word undoubtedly signifies *flowing* or *pouring*. In like manner Kinyras may be understood to represent the wind, because the word Kinyras undoubtedly signifies *wailing* or *piping*. The Greek adjective *kinyros* means wailing, and is regarded by grammarians as a case of onomatopœia, so that we can understand what sort of wailing is meant, namely a plaintive piping noise like that of a distant wind. I cannot doubt, then, that our nursery rhyme describing how Thomas, son of the Piper, hunted pigs, and suffered punishment, is a survival of some old song of the earlier British bards, describing how Thammuz, son of Kinyras the Wailer, was wounded in the boar hunt. In other words, this nursery rhyme presents the nature myth concealed under the story of Adonis, Venus, and Persephone.

Here I must conclude, though much remains to be said not only about the nursery rhymes to which I have referred as too important to be fully dealt with here, but also about others which have been left untouched. It could readily be shown that "the old woman who went up on high to clear the cobwebs out of the sky," is a solar figure, belonging to that exceedingly remote age, when, as Tylor notes, the sun

was regarded as female, the moon as male. With equal clearness it can be shown "that the old woman who lived in a shoe and had so many children she didn't know what to do" (with and for them), is prolific Mother Nature. She supplies their wants as well as she can, though incompletely; whips them all round ("man is born to sorrow as the sparks fly upward"), and sends them to their bed, the grave. Her residing in a shoe, which seems absurd and meaningless, will be recognised as highly significant by those who remember that the emblem of Vishnu, the preservative power of nature, was a shoe-shaped or boat-shaped vessel (reproduced in the symbol that Tacitus describes as "Signum in modum liburnæ figuratum.") The old custom of throwing a shoe after a newly-married pair had its origin in this symbolisation. (Compare in this connexion the mystical rhymes beginning "My dame has lost her shoe.") In like manner other seemingly childish rhymes will be found on examination to be nature myths. In fact, I would in conclusion notice, that the more absurd and childish a nursery rhyme is, the more likely it is, on *à priori* grounds, to have a hidden significance. We may dismiss as altogether improbable the idea that in old times mere nonsense verses were ever composed either for children or for grown folks. The composition of purely nonsensical stories or verses belongs to later and more civilised times, when men have leisure for the absurd. As the older games of children are pictures, only childish because drawn by children, of the serious

pursuits of grown persons, so the older nursery songs were the simple records of beliefs or fancies which grown people really entertained when the songs were made.

(From "TABLE TALK" in the *Gentleman's Magazine.*)

SIR G. C. LEWIS'S inimitable imitation, the *Inscriptio Antiqua*, in which, with admirable gravity, he discusses an Oscan inscription, beginning HEYDIDDLE-DIDDLE, &c., was seriously criticised by more than one reviewer. So I need not be surprised to find that my essay on "Nature Myths in Nursery Rhymes" has been taken by several reviewers *au grand sérieux*. One of these assures his readers that my "complacency can be put down to nothing else than conceit," and solemnly takes me to task for "setting down Cain, Noah, Samson, Abraham, and even David, among solar myths;" which, by the way, I have not done, though I jestingly applaud the multiform mythical meanings assigned to Cain and the rest by Goldziher and Steinthal. Another praises the concise way in which I give "much information on certain points of comparative mythology," but considers some of the accounts of the origin of nursery rhymes so fanciful as almost "to suggest the idea of satire and irony." "It will go near to be thought so shortly." May I suggest to such critics that a writer who meant to be understood seriously would hardly have adopted for

his opening quotation two Latin lines, which, being interpreted, signify—

Beholding these things, the little dog made the welkin ring with his laughing,
And the cow herself leaped athwart the horns of the moon;

or, in the vulgar,

The little dog laughed to see such sport,
And the cow jumped over the moon.

(These lines—the Latin ones, I mean—are not Thackeray's, I believe, though Thackeray has used them in one of his shorter sketches: they are attributed by me, in pursuance of my purpose, to that voluminous author, Mr. Anon.) When we remember the gravity, one may almost say the solemnity, with which the feeblest possible evidence has been advanced for certain mythical interpretations of Biblical and other stories, it may perhaps not be thought quite such conclusive evidence of a humorous intent that I speak of "the mystical words, 'diddle diddle,'" and describe the feeble and unmeaning rhyme about Robert and Richard as a "most interesting legend." Of course it was absolutely essential to the correctness of an imitation of the manner of Goldziher and others, that the evidence brought forward should be correct in itself, however absurd the conclusion which it purports to support. But there is not a paragraph of the essay which should have been taken seriously, from the point where, after quoting with ironical approval several passages of the most feeble reasoning, I open my own argument with the words, "Fortified (!!) by examples such as these."

THE ÆSTHETIC SCHOOL.

A FOREIGNER who should take a hasty glance through the Grosvenor Gallery in 1881 or 1882, might at first suppose it was intended as a place of refuge for works of art (Heaven save the mark!) which elsewhere would be regarded as insults to the public. Looking more carefully through these collections, he would have found many charming works manifestly placed here for their excellence, not for the grossness of their defects. It would probably remain a mystery to him how works so unlike in character came to be side by side in the same collection, did not some English friend tell him of the idiocies of the æsthetic school of art, and of the insolent madness of that school of which Mr. Whistler is the most peccant—we wish we could say, the only—representative.

In the early youth of painting (passing over the Egyptian, Greek, and ancient Roman schools, of whose works we know very little), artists had crude ideas of drawing and colouring, they knew very little of perspective and anatomy, and they had scarce any models worth copying. They had, as children have, a taste for bright colours; and they possessed what children, as a rule, do not possess, the power of depicting beautiful colours, though in inharmonious combinations. Thus we find in their paintings imperfect perspective, angular figures, impossible bones

and muscles, unwholesome complexions, and gaudy ornamentation, but occasionally, very beautiful tints. Of aerial perspective the early painters knew simply nothing, or if they knew anything, they made not the slightest attempt to apply their knowledge.

The paintings of the early schools are therefore necessarily defective, and so far as general effect is concerned, they are, for the most part, in the artistic as well as ordinary sense, simply hideous. But they are full of interest. Moreover, scarcely one of the paintings by the ablest of the early painters fails to show here and there features which, considered alone, are of exquisite beauty. The charm of antiquity appeals to us as we study these ancient paintings. The practised eye can see in them also the germs of the noble works of the great painters who came afterwards. In every national collection these old paintings have a place of honour; every student of art examines them with loving care; and if occasionally there is something of the feeling with which we look over a portfolio of pictures by a child, if there is sometimes a sense of amused wonder at the quaintness of the conceptions and the inadequacy of their rendering, the feeling is softened, much as when, looking at pictures by a child who is dead, the thought comes to us that his tiny fingers never learned to hold pencil or brush with firmness and vigour, that he was never more than the child-artist.

Now, because men of sense and of artistic skill study with love and tenderness these quaint old beginnings

of modern art, there "come you in" certain unwise persons (able enough some of them in special departments of art), hoping to beguile us of our esteem by copying the defects of those beloved old masters who flourished during the childhood of painting. As if some inane person of middle age should take the grotesque drawings of a child, and copy all their absurdities, these imbeciles of the present day (when art, though it should at least have reached its full manhood, ought not to be in second childhood) carefully picture sickly, ill-shaped beings, in impossible attitudes (they call them mediæval, but people in the middle ages were not all crippled and deformed), adorned with tawdry, ill-arranged frippery, and wanting even what the quaint old pictures possessed, occasional touches of beautiful colouring, and occasional bits of effective drawing.

Take, for instance, "The Feast of Peleus," by E. Burne Jones, exhibited in 1882. For what earthly reason is a long-suffering public to be insulted by a picture in which the laughter-loving Goddess of Beauty is represented as a high-shouldered, hideous skeleton? and in which the two rival goddesses who claim the apple (marked by Discord "for the fairest!") are as ugly and dyspeptic as their dreary rival?—uglier they could hardly be. There was some excuse for a Ghirlandajo or a Botticelli who represented a saint as one who had lived an ascetic life—in other words, as a pale, half-starved weakling. But there is not common sense or even decency in picturing these wan

and wasted wretches as "the three great goddesses who claimed the golden apple as the prize of beauty." In the "Tree of Forgiveness," by the same painter, we are pained perhaps more by the offensiveness of the subject (in an artistic sense) than by the hideous complexions and expressions (we say nothing about the utterly incorrect proportions of Demophoon's chest, belly, and limbs, seeing that the painters of this school *must* be all wrong anatomically, or they would not be mediæval). A lady who had been an almond-tree for a while might have such a colour, for aught we know, and a man upon whom such a creature suddenly sprang out might be excused for wearing a very uncomfortable expression. But Venus Aphrodite sick and sorry, worn, wan, and wasted, we really "cannot away with." Mr. Jones is admirable in stained windows; why will he offend those who admire his good work best, by such absurdities as these?

It is, indeed, easy to fall into a way of lightly ridiculing this absurd school. But their offences merit more serious chastisement than mere ridicule. The mischief such paintings do is very serious. Among the inexperienced they create utterly false tastes. They are not only bad in themselves: they are bad in their indirect influence. They kill men's love for the works of the old painters. If there are any who have done more than others to destroy our appreciation of those works, to make them positively hateful and disgusting to us, instead of interesting and delightful

(as rightly viewed they should be), it is their so-called followers, who admire them for their defects, carefully copy their defects, and have nothing in common with them but the worst of their defects.

But if we feel contempt for the paltry affectation of the old style, with what feelings must we regard the mad new style, the Nocturnes in Blue and Silver, the Harmonies in Flesh-colour and Pink, the Notes in Blue and Opal? We are shown a sooty-faced, ill-shaped creature, with limbs entirely out of proportion (do *look* at that left arm!), on a dirty-black background, with smears of vermilion on necklace, lips, and hat, and we are told it is—not a Horror in Soot and Ochre, as our eyes tell us—but (forsooth) a Harmony in Black and Red! A dark bluish surface, with white dots on it, and the faintest adumbrations of shape under the darkness, is gravely called a Nocturne in Black and Gold. A few smears of colour, such as a painter might make in cleaning his paint-brushes, and which neither near at hand nor far off, neither from one side nor from the other, nor from in front, do more than vaguely suggest a shore and bay, are described as a "Note in Blue and Brown." Criticism is powerless here, because one who found these pictures other than insults to his artistic sense, could never be reached by reasoning. We are not sure but that it would be something like an insult to our readers to say more about these "things." They must surely be meant in jest; but whether the public have chiefly to thank Mr. Whistler, or the managers

of the Grosvenor Gallery, for playing off on them this sorry joke, we do not know, nor greatly care.

Meliora canamus!

We shall not dwell further on those enormities of the æsthetic and maniac schools which are manifest at once to the artistic eye. But we must note that a word in excuse may be said for the followers of the modern mediæval school. There is a natural temptation for those who find that, though eager to cover canvas, they can neither draw nor paint, to take work in hand which requires skill neither in colouring nor in drawing. "You are not pretty, my child," said a clever mother to her daughter; "therefore, you had better be odd. It is your only chance of attracting attention." This, which is the *raison d'être* of the æsthetic school generally, is a sufficient principle for the painters of that school. Any one can copy a mediæval picture without faults detracting from its mediæval character: a little change in an impossible limb does not make it less mediævally impossible; a slight difference in some ghastly tint gives only another ghastly hue, which still remains mediævally hideous. Therefore, if we were advising a would-be artist who could neither paint nor draw, and who was too lazy to learn, how he might obtain an easy notoriety, we should tell him to try the mediæval school. "You are too unskilful or too idle," we might say, "to paint anything really good; therefore go in for oddity. Even *your* drawing will not spoil a mediæval figure. You know as much of perspective, linear and

aerial, as the mediæval painters did (who knew nothing); you cannot err much more egregiously through want of talent and energy than they did through want of experience. Follow, then, their school. Carefully copy all their faults. Pretend that you find in deformity beauty which others cannot see, in sickly tints a delicacy of hue which others cannot appreciate. Remembering that as there are always many foolish people, you may be sure of a following, after a fashion." In every age there have been these affectations, though we learn it, unfortunately, not from any works which have survived, for all the works of such schools have a fatal facility in fading out of view, but from occasional passages of ridicule in writings by contemporaries who have survived. In this way the memory of even æsthetic absurdities may be handed down—to an amused posterity.

Of the Whistler school it need only be said that as there are some who take idiocy for ecstacy, there may be a few who find genius in insanity.

BETTING AND MATHEMATICS.

BY R. A. PROCTOR.

WHEN I was travelling in Australasia, I saw a good deal of a class of men with whom, in this country, only betting men are likely to come much in contact —bookmakers, or men who make a profession of

betting. What struck me most, perhaps, at first was, that they regarded their business as a distinct profession. Just as a man would say in England, "I am a lawyer or a doctor," so these men would say that they were bookmakers. Yet, on consideration, I saw that there was nothing altogether novel in this. Others, whose business really is to gain money by making use of the weaknesses of their fellow-men, have not scrupled to call their employment a trade or a profession. Madame Rachel might have even raised her special occupation to the dignity of "a mystery" on Shakespearean grounds ("Painting, sir, I have heard say is a mystery, and members of my occupation using painting, do prove my occupation a mystery"); and if aught of wrong in his employment could be made out to the satisfaction of a bookmaker, his answer might be Shakespearean also, "Other sorts offend as well as we—ay, and better, too."

My own views about betting and bookmaking are regarded by many as unduly harsh, though I have admitted that the immorality which I find in betting has no existence with those who have not weighed the considerations on which a just opinion is based. I regard betting as essentially immoral so soon as its true nature is recognised. When a wager is made, and when after it has been lost and won its conditions are fulfilled, money has passed from one person to another without any "work done" by which society is benefited. The feeling underlying the transaction has been greed of gain, however disguised as merely

strong advocacy of some opinion—an opinion, perhaps, as to whether some horse will run a certain distance faster than another, whether certain dice will show a greater or less number of points, or the like. If here and there some few are to be found so strangely constituted mentally as really to take interest in having correct opinions on such matters, they are so few that they do not affect the general conclusion. They may bet to show they really think in such and such a way, and not to win money; but the great majority of betting men, professional (save the mark) or otherwise, want to win money, which is right enough, and to win money without working or doing some good for it, which is essentially immoral. That in a very large proportion of cases this negative immorality assumes a positive form—men trying to make unfair wagers (by betting with unfair knowledge of the real chances)—no one acquainted with the betting world, no one who reads a sporting paper, no one even who reads the sporting columns of the daily papers, can fail to see. Why, if half the assurances of the various sporting prophets were trustworthy, betting, assisted by their instructions, would be as dishonourable as gambling with marked cards, as dishonest as picking pockets. Here is my "Vaticinator,"[1] the betting man might say, who says that Roguery is almost sure to win the "Beggar my Neighbour" stakes, but if he

[1] I hope there is no turf prophet with this *nom-de-plume*. I know of none, or I would not use the name; but it may have been hit upon by some sporting man with a taste for polysyllables.

does not, that speedy mare, Rascality, will unquestionably win. Here are the bookmakers, who seem all quite as ready to lay the odds against Roguery and Rascality as against any of the other horses, to say nothing of my friends, Verdant and Flathead, who will freely back any of these latter. Now, if I back Roguery and Rascality with the bookmakers, and lay odds against the certain losers in the race, I shall certainly win all round. Of course, "Vaticinator" is not the prophet he claims to be, but the betting man of our soliloquy supposes that he is; and so far as the morality of the course the latter follows is concerned the case is the same as though "Vaticinator's" prophecies were gospel. There is not a particle of real distinction between what the bettor wants to do, and what a gambler, with cogged dice or marked cards, actually does. The more knowing a betting man claims to be, the easier it is to see that he wants and expects to take unfair advantage of other men. Either he knows more than those he bets with about the real conditions of the race or contest on which they wager, or he does not. If he does, he wagers with them unfairly, and might as well pick their pockets. If he does not, but fancies he does, he is as dishonest in intention as he is in the former case in reality. If he does not, and knows he does not, he simply lies in claiming to know more than he does. In claiming to be knowing, he really claims to be dishonest and (which is not quite the same thing) dishonourable; and probably his claim is just. Of

course, this is only a comparatively mild case. Men have been known to take the odds against a horse after they knew certainly that the horse would not run. Others, a shade more advanced, have been known to bribe a jockey to "hold" or "rope" a horse, or a stableman to poison or stupefy him. Owners — aye, even "noble" owners — have been known to work the market in ways fully as flagitious. Every one agrees about these. But the majority are disposed to stare, and perhaps to sneer, when Herbert Spencer describes ordinary, and what is commonly called fair gambling, as immoral; and the calmness with which a betting man claims to be knowing, shows that he, at any rate, does not think wagering with unfair knowledge (with any knowledge short of absolute certainty) dishonourable. He argues, and many who do not bet argue for him, that he takes his chance with others; as if it might not quite as justly be argued that the pickpocket takes his chance between a successful transaction and the prison cell.

As one of our "Five of Clubs," I gave in *Knowledge* a case in which a certain man of title used to offer freely—and possibly with a sense that he was acting quite fairly—a most unfair wager, though it seemed a generous one. Odds of a thousand pounds to one are very tempting to the inexperienced. "I risk my pound," such a one will say, "but no more, and I may win a thousand." That is the *chance;* and what is the *certainty?* The certainty is that in the long run such bets will involve a loss of £1,828 for each

thousand pounds gained, or a net loss of £828. As certain to all intents as that two and two make four, a large number of wagers made on this plan would mean for the clever layer of the odds a very large gain. Yet Lord Yarborough would probably have been indignant to a degree if he had been told that in taking £1 for each hand on which he wagered which did not prove to be a "Yarborough," he was in truth defrauding the holder of the hand of 9s. 0¾d., notwithstanding the preliminary agreement, simply because the preliminary agreement was an unfair one. As to his being told that even if he had wagered £1,828 against £1 the transaction would have been intrinsically immoral, doubtless he and his opponent would equally have scouted the idea.

A curious instance of the loss of all sense of honour, or even honesty, which betting begets, occurred to me when I was in New Zealand. A bookmaker ("by profession," as he said), as genial and good-natured a man as one would care to meet, and with a strong sense of right and justice outside betting, had learned somehow that ten horses can come in (apart from dead heats) in 3,628,800 different ways. This curious piece of information seemed to him an admirable way of gaining money from the inexperienced. So he began to wager about it, endeavouring—though, as will be seen, he failed—to win money by wagering on a certainty. Unfortunately, he came early across a man as cute as himself, and a shade cuter (*à brigand brigand et demi*), who worded the question on which the wager turns, thus: "In how many ways can ten horses be

placed?" Of course, this is a very different thing. Only the first three horses can be placed, and the sets of three which can be made out of ten horses number only 10 times 9 times 8, or 720 (there are only 120 actual sets of three, but each set can be placed in six different ways). My genial, but (whatever he thought himself) not quite honest friend, submitted the matter to me. Not noticing, at first, the technical use of the word "placed," I told him there were 3,628,800 different arrangements: he rejoiced as though the money wagered were already in his pocket. When this was corrected, and I told him his opponent had certainly won, as the question would be understood by betting men, he was at first depressed; but presently recovering, he said, "Ah, well; I shall win more out of this little trick, now I see through it, than I lose this time."

I shall hereafter give some illustrations of the true principles on which all chance questions should be determined. There is no hope that men generally will give up gambling, but it is, at any rate, desirable that when they gamble the chances should be as equal as they can be made; that, in fact, they should not play (as the opponents of Lord Yarborough and of my New Zealand friend were certainly playing) against cogged dice or marked cards. The matter is one strictly appertaining to the subjects with which *Knowledge* and our *Knowledge Library* claim to deal. There is science in chance, certainty in probabilities. What is thus scientific and certain is what we propose to bring before our readers.

FALLACIES.

BY RICHARD A. PROCTOR.

WALKING down to the boat-houses, one day, when I was at Cambridge, a friend (now a clergyman) who was taking part, like myself, in the four-oared scratch races, remarked that his boat was sure not to draw the unlucky first place that day. "How's that?" I asked. "Why, because we have had to row first every day until now, and the luck is sure to change to-day." (It may be necessary to explain that boat-races on the Cam are bumping races—unless where time races are rowed between the last two or three left in—and that the first place is, of course, the worst in a bumping race, for the simple reason that the first boat shares with the others, all but the last, the risk of being bumped, but cannot make a bump. In the eight-oared races, indeed, the first place is the place of honour, attained by bumping boats below; but where, before a race, lots are drawn for position, the first place is the worst, the last place the best.) I tried to explain to my friend what seemed so obvious as to need no explanation, that his fate in the day's drawing could not possibly be affected by the results of previous drawings. The simple circumstance that to draw a given place day after day, for six days (five were past), was a thing unheard of, so far as he knew,

sufficed to assure him that his coxswain would not that day draw a particular ticket. It so chanced that what he was sure would not happen did actually happen, though it would in no way have affected my argument if his hopes had been fulfilled.

The mistake made by my friend on this occasion is one of the commonest fallacies respecting the laws of chance. Of course, it requires no mathematical knowledge or reasoning to show the opinion to be quite erroneous that past events can in any way influence events which are of their very nature entirely independent of them. If there is an urn in which we know that there are a number of white and a number of black balls, and we draw one after another several white balls, *not returning them*, we have some reason for thinking that we are more likely to draw a black ball at the next trial, for every white ball drawn diminishes the chance that the next one drawn will be white. But if each ball after being drawn is replaced, it is evident that the chance of drawing a white ball at any given trial must be the same as that of drawing it at the first or at any other trial. Or take the tossing of a coin. Antecedently it seems so unlikely that head (say) will be tossed ten times running, that we can easily imagine how any one who had tossed head nine times running might entertain for a moment the idea that he was less likely to toss head the tenth time. But if he had any reasoning power at all, and used it, he would see that no number of past trials could in any degree affect the next tossing.

There is a fallacy equally common, and held commonly by the same persons who make the mistake just considered, which yet is opposite to it in character —in fact, directly contradictory to it. The mistake we have dealt with above may be called belief in the change of luck, and in a somewhat disguised form it is this foolish fallacy which leads the weak-minded pigeon to fall an easy prey to the rooks, from the fond delusion, in which, of course, they encourage him, that though he has lost—or rather because he has lost for a long time—he must presently begin to win. The fallacy we have next to mention is faith in luck. You will hear people say that they never have luck in games of chance, or that they always have luck; and you will find hundreds ready to believe in the good luck or bad luck of others. We say that this belief is contradictory to the other. If it be considered for a moment, this is seen to be the case. What does belief in a man's good or bad luck mean but that, because he has been fortunate or unfortunate for a long time, he will continue to be so? and what does the other belief mean but that, because the luck has been one way for a long time, it will no longer continue to be so? One would suppose that two ideas so incompatible with each other could not exist in company; that every one must see one or other to be fallacious, or (which, of course, is the actual case) that both are so. Both views are in fact ridiculous, though both, with many other equally preposterous superstitions, are entertained by persons who are not

supposed to be wanting in keenness of perception, and in other matters are intelligent enough. Here, for instance, is an account given by one keen card-player of another who was as keen, or keener. "He was very particular about cutting the cards; he always insisted on the pack being perfectly square before he would cut, and that they should be placed in a convenient position. There is an old adage that a slovenly cut is good for the dealer, but whether there is truth in the statement we know not. He was superstitious to a degree that was astonishing." (It must be a rather startling superstition that would seem astonishing to a man who could gravely ask whether there is any truth in the preposterous adage just quoted.) "We are not aware that any one has ever attempted to solve the problem why so many great minds" (among card-players, fighting men, and men who have to work much at odds with fortune) "are superstitious. This is not the time or place to attempt that solution. We record the fact. He believed in dress having something to do with luck, and if the luck followed him, he would wear the same dress, whether it was adapted to the weather or not. He believed in cards and seats. He objected to any one making a remark about his luck. He had the strongest objection to our backing him, because of our bad luck, and we have often had to refrain from taking odds, because of this fad. He was distressed beyond measure if any one touched his counters. His constant system of shuffling the cards was

at times an annoyance." This was a great card-player!

It will be asked, perhaps, how cases of notoriously lucky men are to be accounted for, if there is no such thing as luck. If the laws of probabilities say that no man can be regarded as a lucky or unlucky man in matters of pure chance, how is it that so many men have been lucky or unlucky? But science by no means denies that men have been or will be lucky or unlucky; on the contrary, the laws of probability can *prove* that among the millions who try their fortunes in matters of pure chance, thousands must be exceptionally lucky or unlucky, and a few must have luck perfectly marvellous to all who witness it. Given the nature of any chance game and the number who play at it, science can tell, within very narrow limits of error, how many will have ordinary luck, how many will have moderately good or moderately bad luck, how many will be very lucky or very unlucky, and how many will have absolutely astounding luck of one sôrt or the other. When science is asked how, with her absolute rejection of all faith in luck, she can account for men who have had amazing runs of good or bad luck, science can reply not only that she has no difficulty in accounting for them, but that she can prove this to be to all intents and purposes inevitable.

What, then, is it that science rejects as untenable, or how, with such views, can science be truly said to have no faith in luck? The answer is, that the laws of probability—and (rightly understood) the laws of

common sense—forbid our believing that a man *is* either lucky or unlucky. He may have been so; but, so far as matters of pure chance are concerned, the man who has been most unlucky is as likely as not to be lucky at any given trial as one who has been exceedingly lucky. He is not more likely to be so, as the fallacy respecting change of luck implies, nor is he less likely, as the fallacy of faith in luck implies; he has simply just the same chance as another, neither better nor worse.

If twenty million persons in England were to begin tossing a coin, each stopping so soon as he tossed "tail," and each to receive a pound for one head, two for two heads, four for three, eight for four, sixteen for five, and so forth, it is practically certain that several would win a prize of £131,072 after tossing head eighteen times running, and all but certain that some would get the prize of £262,144 for tossing head nineteen times running, and one or two perhaps the prize of £524,288 for tossing head twenty times running. These would all have been very lucky persons (and as long as they kept their winnings, we may say that they were in luck afterwards as well as before). The laws of probability show that among so many trials there must be some such lucky persons. But supposing the experiment repeated, science assures us that those persons who had been so lucky would have neither a better nor a worse chance of success than those who had had but moderate luck, or the unfortunates (some ten million in number) who

had tossed tail at the first trial. What would believers in the two fallacies we have considered, think? If they had watched one of the luckiest tossers, would they say that, as he had tossed head so many times running, he was unlikely to toss a single other head in the second trial, or that, as he had shown himself a lucky man, he was sure to continue tossing heads in the second trial also? One idea is as consistent with the common fallacies about luck as the other. Both cannot be true; but, in point of fact, they are alike erroneous. Carefully studied, each is seen to involve an absurd mistake.

Some correspondents of *Knowledge* asked, however, whether the evidence does not show that some men really are exceptionally lucky (so that their luck in matters of pure chance may be relied on); others asked whether, if a coin had been tossed a great number of times with the same result (head or tail) in one set of trials, it would not be more likely to show the other side (tail or head) oftener in the next set of trials; while yet others considered that the ideas of men of science about fallacies generally are erroneous —that, in fact, the so-called fallacies are real truths.

Taking the last first, I may note that the rule of science in all those cases in which specific results are popularly supposed to follow from specified actions, or the like, is simply to inquire whether there can possibly

be any relation of cause and effect in such cases. When a housemaid says, for instance, that putting the poker across a fire makes the fire burn up, the student of physical laws is able at once to see that the supposed influence is antecedently most improbable. Here in a grate are certain more or less combustible materials, and certain quantities of matter already burning; combustion is going on, though indifferently; the air is nourishing this slowly burning fire, but inefficiently; on the whole, it seems likely that the fire will go out. In what way shall I do any good if I stick a rod of iron from the fender across the top bar? I thus add a certain quantity of cold metal to the space across which the air has to come to the fire. Do I increase the draught? On the contrary, so far as I produce any effect at all on the draught, I must diminish it. For the draught depends in the main on the diminished density of the warmed air in the neighbourhood of the fire, and the cold metal must to some degree increase the density of this air by cooling it. The effect may be very slight; but such as it is, it is unfavourable. But there was a correspondent who told me that whether theoretically the poker should make the fire burn up or not, as a matter of fact it does. Repeatedly he had tried the experiment, and after exhausting in vain every art he possessed to make the fire burn up, he found the poker put across the top bar immediately, or almost immediately, produced the desired result. Science is bound to listen to evidence of this kind, for science deals with phenomena, and even

when phenomena seem to point to something which appears utterly incredible, science has to inquire into the matter. Well, in this case, what are the facts? Some one tells us that he has repeatedly tried in vain to make a fire burn up, but when he put the poker across it, the fire presently became clear and bright. Multitudes of contrary cases might no doubt be cited, but let us suppose that none could. Are we therefore to infer that in these cases the poker drew the fire up? A new law of nature would be indicated, if this were so; and a new law of nature is worth learning. But when due inquiry is made, it appears that there is no such law—as unfortunately we might have expected. Our correspondent, who found that when he put the poker across the fire it drew up, is unquestionably but an unskilful fireman. He puts on coals, and pokes and stirs the fire, unconscious of the fact that this is just the way to put a fire out. When the fire is all but hopelessly reduced by his unskilful measures, he puts the poker across the top bar. According to old-fashioned superstitions, he makes the sign of the cross across the fire-place, and the fire, in which until now there seemed to have been some evil spirit (that is what people mean when they say "the devil's in the fire"), is purified from the unclean presence and begins to burn up. That would have been the old-fashioned interpretation of the change; unfortunately, science takes another view of the matter. It sees reason to believe that the change took place simply because the disturbance to which the fire had before

been exposed was bad for it. Putting the poker across the top bar meant letting the fire alone, and giving it a chance to burn up.

Singularly enough, I had occasion, when the last sentence was just finished, to leave my study. When I came back, an hour later, I found that my fire, which in the meantime must very nearly have gone out, had been recoaled — and the housemaid, or whoever had attended to it, had, after the fashion of her tribe, put the poker across the top bar. The fire was not burning very brightly—on the contrary, it seemed inclined to go out. Yet, rashly daring, I put the poker down—from scientific principles I object to seeing bright metal smoked and dulled—and went on with my work, intending, if the fire went out, to call some one in to light it again. However, it so chanced that after the poker was put down, the fire began to burn pretty brightly, and as I write there is every promise of a good fire. Am I to infer that taking the poker from across the top bar made the fire burn up? Of course, the real fact was, that when the fire seemed dull it was really making steady progress, and whether I had taken down the poker, or supplemented its salutary action by putting another poker across the top bar, would have made not one particle of difference.

That our domestic servants should consider the poker across the top bar a specific for making a dull fire burn up is very natural. Their manner of treating fires is unscientific in the extreme. A Cambridge Fellow, who knew very little about the fair sex,

except what he might gather from the ways of "bed-makers" and his recollections, perhaps, of domestic servants at home, used to define woman as "an inferior animal, not understanding logic, and poking a fire from the top." Most servants do this. They also have two utterly erroneous ideas about making up a low fire: first, that the more fuel is put on the better; secondly, that after putting coal on it is desirable to stir the fire. As a matter of fact, when a fire is low, the addition of fuel will often put it out altogether, and the addition of much fuel is almost certain to do so; and in every case the time to stir the fire (when low) is before coals are put on, not after. Generally it is well, when a fire is low, to stir it deftly, so as to bring together the well-burning parts, and then to wait a little, till they begin to glow more brightly; then a few coals may be put on, and after awhile the fire may again be stirred and some more coals put on it. When a low fire has been unwisely treated by being coaled too freely, and the fresh fuel uselessly stirred, it is generally the case that the only chance for the fire is leaving it alone. Susan does this when she puts the poker across the top bar, and unconsciously she retains the old superstition that by thus making the sign of the cross over the fire, she sends away the evil beings, sprites, or whatever they may have been, which were extinguishing it.

That letting the sun shine on a fire puts it out is not, like the other (in its real origin, at any rate), a superstition, but simply an illusion. A correspondent

writes that it is believed in by nine persons out of ten; but in this it is like all other wrong beliefs. Scientific methods of inquiry and reasoning are followed by fewer than ten in a hundred; and although now-a-days the views of science are accepted more widely than in olden times, this is simply because science has shown its power by material conquests.

I do not think that my friend Professor Tomlinson's experiments on the burning of candles in sunlight and in the dark would be regarded by all as decisively showing that sunlight does not interfere with combustion, though, rightly apprehended, they go near to prove this. But *à priori* considerations show conclusively that though by warming the air around a fire the sun's rays may, in some slight degree (after a considerable time), affect the progress of combustion, they cannot possibly put the fire out in the sense in which they are commonly supposed to do so; in fact, a fire would probably burn somewhat longer in a room well warmed by a summer sun than in a room from which the solar rays were excluded. (The difference would be very slight.)

WINNING WAGERS.

BY R. A. PROCTOR.

It is rather singular that any writer who points out the folly, or worse, of wagering, is nearly always supposed by a large section of his readers to have wagered a great deal, and to be ready to wager a great deal more. An article I wrote about lotteries for the *Cornhill Magazine* immediately brought me several invitations from the Continent and from America to purchase tickets in sundry lotteries. Since I wrote about betting in *Knowledge*, I have been asked (who have never wagered a shilling on a race) to give hints for wise wagering whereby fortune may be gained without the usual equivalent of work done. My attention has been directed to the success which book-makers have achieved, and I am asked to put the young and verdant sportsman on the track which has led to so agreeable a goal. I am further reminded that it is all nonsense for me to assert that betting and gambling must end badly in the long run, for if so much money is lost, much money must be won. "Why may not I," for instance, asks one, "be a successful votary of fortune, and win some of the money which you say is always lost by those who wager freely and often?"

Well, not only is this so (I have known a young

City clerk win £1,500 on the Derby, and——regret it for years as the worst misfortune that had ever befallen him), but there are ways by which Fortune can be set on one side altogether, and money always won on a race, by any one who, knowing how to proportion his wagers, can give time enough to the subject to get all the wagers made which the system requires.

At the outset, let me note that it is by no means necessary that the system I am about to describe should be carried out in a precise and formal manner. If you have a tolerably large capital, or if, in case of failure, you have courage (greatly daring) to run away, you may leave a little to chance on every race, and then, if chance favours you, your gains will be proportionately greater.

The system is exceedingly simple—and it will be found that when the method of the great bookmakers is analysed a little, there underlies it the fundamental idea of the system,—yet probably not one among them knows anything about it in detail, though he may thoroughly well understand that his method leaves very little to chance.

First, always lay odds against horses, never back them. This is not essential to the system regarded in its scientific aspect; but in practice, as will presently appear, it makes it easier to apply it.

Lay against every horse in a race as early as possible, when the odds are longest. If you lay against a few which are certain not to run, so much the

better; that is so much clear gain to start with. Proportion your wagers so that the sum of what you lay against a horse, and what he is backed for, may amount to about the same for each horse. The precise system requires that it should be exactly the same, but you will find that you can often improve upon the system by taking advantage, in special cases, of your own knowledge of a horse's chance and your opponent's inexperience. In every case lay odds a point or two short of the legitimate odds against a horse. Suppose for a moment that the odds are ten to one against him, then it will always be easy to find folk who rather fancy the horse, and think the odds are not eight to one, or even six to one, against him; select such persons for your wagers about that horse. Convey carefully the idea that you also think his chance underrated at eight, or even nine to one; but, as a favour, make the odds nine to one. Of course, you need not search about for those who favour any given horse. Every greenhorn has a fancy for some horse, and is willing to take something short of the current odds for the privilege of backing him. You can, therefore, fill in your book *pro re natâ*, until at least you have made up your amounts for most of the horses engaged, when you will, of course, give more special attention to those whose leaf in your book is as yet incomplete.

Now, let us take an illustrative case to see how this system works:—

Suppose there are nine horses in the race, to

wit:—A, B, C, D, E, F, G, H, and K. Let the odds be,—

3 to 1	against	A	11 to 1	against	F
5 to 1	„	B	11 to 1	„	G
7 to 1	„	C	19 to 1	„	H
9 to 1	„	D	23 to 1	„	K
9 to 1	„	E			

(You should be careful to note that when these odds are reduced to chances, becoming respectively

$\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$, $\frac{1}{10}$, $\frac{1}{12}$, $\frac{1}{12}$, $\frac{1}{10}$, $\frac{1}{10}$,

their sum should be unity, or very near it. It does not matter at all—except to backers—if the sum is greater than unity, as it generally is; but if it should be less than unity, the exact application of the system would involve loss to you and gain to the backers, which is not your object.)

Well, then, you may let the wagers on each horse amount to £1,000 (or for convenience, and to avoid fractions, say £1,200), if the race is important, and bets much in request; but the system, in its beautiful adaptability, may be applied to shillings quite as well as to pounds.

Apart from the extra points you allow yourself, you ought to lay, in all—

£900	to £300	against	A
£1,000	to £200	„	B
£1,050	to £150	„	C
£1,080	to £120	„	D
£1,080	to £120	„	E
£1,100	to £100	„	F
£1,100	to £100	„	G
£1,140	to £60	„	H
£1,150	to £50	„	K

But you reason (with intending backers) that "the race is a moral certainty for A, and that it is giving away money" to lay more than (in all) £800 to £300. Again, "B is a much better horse than people think, so that £900 to £200 is quite long enough odds against him;" as for C, "no wonder backers stand by him at the odds;" for your part you "think him better than B; and see what Augur says of him!" and so forth, wherefore you cannot find it in conscience to lay more than £950 to £150 (in all) against him. (It gets easier as you reach the non-favourites to get the odds shortened.) So you deal with each, cutting off £100 (let us say); but with the horses low in favour, you can easily cut off more, and the system not only does not forbid this but encourages it. Say, however, only £100, and then your book is complete.

You can now watch the race (if you like) with thorough enjoyment. The pleasure of the backers of the favourites is a good deal impaired by anxiety, and though backers of non-favourites have less to lose, they have more to gain, and less chance of gaining it: so they too are anxious. But *you* can take a real scientific interest in the race. You may, if you please, try to recognise Muybridge's "Attitudes of the Galloping Horse," as the fleet steeds rush past your post of observation.

For, let the race go as it may, you clear £100. If A win, you pay his backers willingly £800, receiving £200 from the backers of B, £150 from those of C, and so on—in all, £900. If B win, you pay his

backers £900, and receive from the backers of A, C, D, &c., £1,000, and so on, whichever horse may win. You need not, as a rule, be afraid about being paid; these are debts of honour, and to be paid before all sordid trade debts—nay, so sacred are these debts, that many of your clients would deem it better to break open a till, or to embezzle a round sum from an employer, than to leave them unpaid. So you need be under no anxiety.

It occurs to me that some of my betting readers may say, We have not time for this; we do not want to be bookmakers, but to make our occasional wagers on safe lines, as *they* do their systematic ones. In that case, you might back each horse in the race once, so that the total wagered about him by you and the bookmakers may be a fixed sum, *less* whatever you can get off the market odds. For instance, say the sum is to be £120, in the case of each horse in the above list; then you should back A at the odds of £90 to whatever sum less than £30 a bookmaker will take. Suppose (I cannot suppose it myself, but you may) he will give you £90 to £29; and that you can arrange similarly for each horse of the nine, offering to back him for a sum always £1 short of the true amount at the odds. Then you will gain £1, however the race may end. It is not much, but—I wish you may get it.

It is easier to tell you how to lose. This may be effected by adopting *the other part* of the bookmaker's system. *He* always lays the odds a little short: do

you always take them so. Back the favourite boldly; but do not fail to take fancies for non-favourites, and back your fancies boldly too. It would be absurd to haggle about odds in the case of a horse which is morally sure to win, or to insist on ten to one when you feel sure the odds are not seven to one against a horse. When you win, assure yourself you are "in the vein," and go on betting; if you lose, assure yourself "the luck must change," and go on betting. By continuing patiently on this course, it will be strange if you do not learn before long—how it is that the bookmakers make so much money.

Let me, in conclusion, quote two short passages, one from a letter by Charles Dickens, the other from a speech by Lord Chief Justice Cockburn. The first seems to relate to the successful bookmaker:—"I look at the back of his bad head repeated in long lines on the racecourse, and in the betting stand, and outside the betting-rooms, and I vow to God I can see nothing in it but cruelty, covetousness, calculation, insensibility, and low wickedness. . . . . If a boy with any good in him, but with a dawning propensity to sporting and betting, were but brought here soon enough, it would cure him." The other passage applies to the bookmaker and his victim alike:—"The pernicious and fatal habit" of betting "is so demoralising and degrading, that, like some foul leprosy, it will eat away the conscience until a man comes to think that it is his duty to himself to 'do his neighbour as his neighbour would do' him."

"THE MYSTERY OF EDWIN DROOD."

BY THOMAS FOSTER.

In the *Cornhill Magazine* for February, 1864, Charles Dickens, speaking of the work which had been left unfinished by the great writer who died on Christmas Eve, 1863, said:—"Before me lies all that he had written of his latest story . . . . and the pain I have felt in perusing it has not been deeper than the conviction that he was in the healthiest vigour of his powers when he worked out this last labour." In June, 1870, not six years and a half after Thackeray's death, the poet Longfellow wrote thus of the work left unfinished by Dickens:—"I hope his book is finished. It is certainly one of his most beautiful works, if not the most beautiful of all. It would be too sad to think the pen had fallen from his hand, and left it incomplete." As we all know, the pen had so fallen. The "Mystery of Edwin Drood" was not to be unravelled by the master-hand which had interwoven its seemingly tangled skeins. How Dickens would have worked out the story we can never know. It has even been said by one who had better opportunities of knowing what Dickens had planned than any other, save perhaps one alone, that "the evidence of matured designs never to be accomplished, intentions planned never to be executed, roads of thought marked out never to be traversed, goals shining in the

distance never to be reached, was wanting here: it was all a blank." In "Denis Duval" the end is shown. We know that whatever hardships and dangers are in store for Denis, all ends well at last. "Who, pray, was Agnes?" Denis writes:—"To-day her name is Agnes Duval, and she sits at her work-table hard by. The lot of my life has been changed by knowing her,—to win such a prize in life's lottery has been given to very few. What I have done of any worth has been done by trying to deserve her. *Monsieur, mon fils,* if ever you marry and have a son, I hope the little chap will have an honest man for a grandfather, and that you will be able to say, 'I loved him,' when the daisies cover me."

It is otherwise with the "Mystery of Edwin Drood." We have no direct indications of the end towards which the story was to tend. There are indications, some sufficiently plain, others carefully masked, so to speak; others, we may be sure, intended specially to draw the reader's attention away from the writer's purpose. But the clear indications relate only to one set of circumstances. In writing this story as in writing "Our Mutual Friend," Dickens probably "foresaw," to use his own words, "the likelihood that a class of readers and commentators would suppose" he "was at great pains to conceal exactly what he was at great pains to suggest," and "was not alarmed by the supposition." But here also he proposed to himself, unless I mistake, "to keep for a long time unsuspected, yet always working

itself out, another purpose originating in the leading incident, and turning it to a pleasant and useful account at last." In writing that preceding work he had found this the most interesting and the most difficult part of his task. We may well believe, apart from the strong evidence afforded in the story itself, that Dickens intended to renew this interesting task, making use of the experience he had already acquired to overcome its difficulties. And it is as to this carefully concealed purpose that the indications of the story in its unfinished condition are most obscure, even where they are not intended to be actually misleading.

Yet I venture to think that Forster was mistaken in regarding the story as "all a blank" in this respect. I believe that the purpose which Dickens intended to be little suspected by the class of readers who supposed he intended carefully to conceal what he was at great pains to suggest, can be recognised, can even be felt, by more discerning readers. Assuredly the concealed purpose in "Our Mutual Friend" was concealed only from the undiscerning. No one who understood the varying tones in which Dickens spoke, and had thus learned to hear something more than was conveyed by his mere words, could be really deceived by the changed Mr. Boffin. Not only does the whole tone of the description show that underlying the seeming change is the older character of the man, but subtle indications are scattered here and there such as no discerning reader can overlook, such as

indeed the writer himself is careful to note further on, as if for the special discomfiture of those who had misinterpreted him. I think that a similar remark applies to the "Mystery of Edwin Drood." The tone in which the several characters, at least the leading characters, are spoken of, should leave no one familiar with Dickens' manner in the least doubtful as to the general nature of the fate which was at the end to be allotted to them. We hear the pleasant final fortunes of Crisparkle and Tartar in the ringing notes in which their earlier doings are described, as clearly as we hear the sad yet noble fate of Neville Landless in the minor key in which he is spoken of, and in which he speaks—except when roused to fury by Edwin Drood, maddened, like himself, with the wine which Jasper had drugged. But besides the indications of these tones, there are subtle indications, sufficient for the guidance of the understanding reader, not, indeed, as to the exact nature of the path along which the story was to be conducted, but as to its general direction and its final goal.

Let us consider some of these, not because of any real importance to be attached to the question how Dickens had intended to develop the story, but because many have been deterred from studying this beautiful fragment by the belief that it is too incomplete to afford any evidence of its author's design.

The story, so far as it runs, must first be sketched, but very briefly, and not so much with the idea of conveying even its general purport to those who have

not read it, as to recall its leading incidents to those who have.

Edwin Drood, "little more than a boy," and Rosa Bud, "wonderfully pretty, wonderfully childish, wonderfully whimsical," but withal wonderfully lovable, have been betrothed by their fathers, who had both been left widowers in early youth, and had both soon after died. John Jasper, choirmaster of the Cloisterham Cathedral, uncle of Edwin Drood, and the dark villain of the story, is secretly to all others, but only too plainly to Rosa herself, in love with her. The purpose which the author is "at great pains to suggest, but which a class of readers would suppose he was at great pains to conceal," is John Jasper's plot to murder Edwin Drood. Nor is the nature of the plot hidden. We know that Edwin is to be strangled with the "large black scarf of strong close woven silk, slung loosely round Jasper's neck," as he leads the choir during the vesper service on that Christmas Eve when Drood disappears. We have reason to believe that afterwards he looks down on the body of his victim from a great height, such as those from which he had looked down during his ascent of the Cathedral Tower; for later, in a vision of the deed, "as it was really done at last," he cries: "Look down, look down! you see what lies at the bottom there." It is clearly conveyed to us that he had planned to dispose of Drood's body by quicklime. For we find that Jasper has been careful to learn what jewellery Drood wears, so that whatever would not

be destroyed by the action of quicklime may be removed. The jewellery thus removed he casts into the Cloisterham mill-stream close by the weir, where they are found by Crisparkle, and serve to bring fresh suspicion upon Neville Landless, whose love for Rosa Bud, Jasper's jealous eyes have noted. Landless and his twin-sister Helena are Ceylonese, the wards of Mr. Luke Honeythunder, a philanthropist of the gunpowderous sort, "calling aloud to his fellow-creatures, 'Curse your souls and bodies, come here and be blessed.'" Neville is entrusted by him to the care of Minor Canon Crisparkle, Helena to the charge of Miss Twinkleton, who presides over the Nuns' House, seminary for young ladies, where Rosa and Helena are to be fellow-boarders. Edwin Drood and Rosa Bud have been betrothed by their parents, but have only liking for each other, and even that feeling endangered by their betrothal. Drood admires the dark beauty of Helena Landless, but is not very earnest even in that. Neville's heart is won at once by the "beautiful young creature whom Drood treats like a doll." Jasper so plays on the feelings of both young men, whose wine also he drugs, that Drood insults Landless past bearing, and that Landless "would have cut Drood down," but for Jasper's interference, and openly acknowledges as much to Crisparkle afterwards. Hence, after the disappearance of Edwin Drood, suspicion falls on Neville Landless. It is strengthened when Drood's watch and shirt pin are found in the mud and ooze of the river by which

Drood and Neville had walked at midnight on that Christmas Eve. Six months after the murder, Jasper openly expresses to Rosa Bud the love which before he had silently but to her most clearly shown. He warns her, also, that Neville's fate is in her hands,—that whether Neville is innocent or guilty, he, Jasper, can so bring the murder of Drood home to him that his fate would be sealed. Rosa flies to her guardian, Mr. Grewgious, an angular man, but true and chivalrous withal. The threatened danger is communicated to Neville, who is in chambers in London. By good fortune the tenant of the next top set in Staple Inn to those occupied by Neville turns out to be an old schoolfellow of Crisparkle's, one Lieutenant Tartar, who at once sets his rooms and services at the disposal of Rosa and her friends, thus opening a way of communicating with Neville without Jasper's knowledge. At the same time, as Helena Landless suggests, the plan opens out the probability that Jasper may warn Tartar against Neville, supposing Tartar to have simply come to know Neville as a neighbouring tenant of the Inn, in which case the terms of Jasper's communication might throw some light on the nature of his plot against Landless.

Two other points remain to be briefly touched upon before considering the features which seem to suggest how the story was to have been worked out. The first is the appearance of a stranger in Cloisterham, a Mr. Datchery, who has manifestly set himself the task of watching Jasper's movements, and has also

manifestly a special scheme for Jasper's discomfiture, the nature of which is hinted at in a passage presently to be referred to. The other is the return of Jasper to the opium-eaters' den, and the first attempt of the old woman who keeps it to extract his secret from him. There can be little doubt that in the rest of the story the points here introduced were to have played an important part.

Several scenes and characters not mentioned in this brief sketch of the story, so far as written, will be touched upon in what follows.

Of course, no manner of doubt can be entertained by any one who has read the story, that Jasper is guilty and Neville Landless innocent. The "Mystery of Edwin Drood" does not turn in any way on that point. It seems to turn in some degree, however, on the way in which Jasper did the deed; though in reality, unless I greatly mistake, the real explanation of the mystery was to have been much more startling than a mere account of Jasper's procedure. It will be well to consider this point first, however.

If we wish to learn the nature of Jasper's scheme, we must specially note the opening words relating to it. It is in Chapter IV. that Jasper takes the first step towards his end. It is manifest from the tone of the chapter that the visit to Sapsea is a part of Jasper's plot; but we also know that in Dickens' number-plan of the story he had written "Mr. Sapsea: old Tory jackass: connect Jasper with him (he will want a solemn donkey by and by)." Accordingly the

first words of Chapter IV. present to us Thomas Sapsea, Auctioneer and Jackass. The first meeting of Sapsea and Jasper shows that what the latter wants is to get acquainted through Sapsea with tomb-mason Stony Durdles, and in such a way as to have opportunity and seeming reason for examining the cathedral crypt. That Jasper and Durdles were to call at the same time is shown after Dickens' usual manner (who never leaves any point of a story unmarked), by the words, "There are three wine-glasses in a tray on the table." A careless reader would be apt to overlook these words and their relation to the visit of Durdles, for whom, we read a page or two later, Sapsea "fills the third wine-glass." But the words are intended to show that Durdles' visit was not casual, that Jasper had, in fact, timed his visit, by appointment, so as to meet Durdles.

We find later—that is, if we have noted such points as these—a sufficient reason for Jasper's desire to get acquainted in this special way with Durdles. In Chapter XII. Jasper, the Dean, Sapsea, and Tope (the verger) are together in the cathedral churchyard. Jasper says of Durdles, "My curiosity in the man was first really stimulated by Mr. Sapsea . . . though of course I had met him constantly about;" on which Sapsea, "picking up the ball thrown to him, with ineffable complacency," says, "Yes, yes, I happened to bring Durdles and Mr. Jasper together." Then Jasper, playing yet further on Sapsea's conceit, explains to the Dean that he is about to make "'a

moonlight excursion with Durdles among the tombs, vaults, towers, and ruins;' 'you remember,' he adds, addressing Sapsea, 'suggesting, when you brought us together, that, as a lover of the picturesque, it might be worth my while.' 'I remember!' replies the auctioneer, and the solemn idiot really believes that he does remember. 'Profiting by your hint,' pursues Jasper, 'I have had some day rambles with the extraordinary old fellow, and we are to make a moonlight hole-and-corner exploration to-night.'" In passing note the words "day rambles" and "extraordinary old fellow" in this remark. The natural reply would have been, "I have had some rambles with Durdles;" but Jasper is anxious to let it be known, first, that as yet he has made no nocturnal visit to the crypt, and secondly, that it is only as a lover of the picturesque and odd that he has cultivated Durdles' acquaintance. It is not Dickens' manner (at least not his later manner) to tell us this in so many words; but the words "day rambles" and "extraordinary old fellow" tell it us plainly enough. Only we have to be carefully on the watch for subtle indications of this sort, if we wish to gain an inkling of what underlies the obvious plot of the story.

Let us return to the first meeting between Jasper and Durdles. It contains a passage strikingly illustrating Dickens' method, and bearing very significantly on sequent parts of the narrative.

Durdles has asked Sapsea for the key of the monument over Mrs. Sapsea. "Mr. Sapsea rises, takes a

key from a drawer, unlocks an iron safe let into the wall, and takes from it another key. 'When Durdles puts a touch or a finish upon his work, no matter where, inside or outside, Durdles likes to look at his work all round, and see that his work is a-doing him credit,' Durdles explains doggedly. The key proffered him by the bereaved widower being a large one, he slips his two-foot rule into a side pocket of his flannel trousers made for it, and deliberately opens his flannel coat, and opens the mouth of a large breast-pocket within it before taking the key to place it in that repository. 'Why, Durdles,' exclaims Jasper, looking on amused, 'you are undermined with pockets.' 'And I carries weight in 'em too, Mr. Jasper. Feel those!' producing two other large keys. 'Hand me Mr. Sapsea's likewise. Surely this is the heaviest of the three.' 'You'll find 'em much of a muchness, I expect,' says Durdles. 'They all belong to monuments. They all open Durdles' work. Durdles keeps the keys of his work mostly. Not that they're much used.' 'By the by,' it comes into Jasper's mind to say, as he idly examines the keys, 'I have been going to ask you many a day, and have always forgotten. You know they sometimes call you Stony Durdles, don't you?' 'Cloisterham knows me as Durdles, Mr. Jasper.' 'I am aware of that, of course. But the boys sometimes——' 'Oh! if you mind them young imps of boys——' Durdles gruffly interrupts. 'I don't mind them any more than you do. But there was a discussion the other day among the choir

whether Stony stood for Tony,' clinking one key against another; ('Take care of the wards, Mr. Jasper'); 'or whether Stony stood for Stephen,' clinking with a change of keys; ('You can't make a pitch-pipe of 'em, Mr. Jasper'); 'or whether the name comes from your trade. How stands the fact?' Mr. Jasper weighs the three keys in his hand, lifts his head from his idly stooping attitude over the fire, and delivers the keys to Durdles with an ingenuous and friendly face. But the stony one is a gruff one likewise, and that hazy state of his is always an uncertain state, highly conscious of its dignity, and prone to take offence. He drops his two keys back into his pocket one by one, and buttons them up; he takes his dinner bundle from the chair-back on which he hung it when he came in; he distributes the weight he carries by tying the third key up in it as though he were an ostrich and liked to dine off cold iron; and he gets out of the room, deigning no word of answer."

Durdles' remark about his liking to look at his work inside and out when he puts a touch or finish upon it, is sufficiently significant. Nor is it difficult to perceive that Jasper takes special interest in the key of Mrs. Sapsea's monument. But there are passages in the narrative which are not at first sight so obviously suggestive. Of course, Jasper's inquiries about Durdles' nickname have no other significance than is to be recognised in the fact that he keeps Durdles waiting while appearing to ramble on without

special purpose. We know from this that he has some plan, and that that plan is not in the remotest degree connected with the subject of his questions—in which he takes no sort of interest. But what is Jasper's plan? Take the words on which the least possible stress seems laid and we recognise it at once. "Clinking one against another;" ("Take care of the wards, Mr. Jasper"); "clinking with a change of keys;" ("You can't make a pitch-pipe of 'em, Mr. Jasper"). It is clear that Jasper has engaged Durdles in idle converse to gain an opportunity for testing the tones emitted by the several keys when struck, in order that he may be able to distinguish one from the other, if he should have occasion to, *in the dark*, which, to his practised ear, would be easy, after he had once sounded them in this way.[1]

[1] Dickens, in his later works, seems to have found pleasure in imagining such practical applications of special forms of knowledge or of skill. Thus in "Our Mutual Friend," when Mr. Boffin was going to dig, he "tucked up his cuffs, spat on his hands, and then went at it like an old digger as he was. Some dozen or so of expert strokes sufficed." Venus had said a few minutes before that Boffin "knows how to use it" (his shovel), "remember, fifty times as well as either of us." Venus himself in another scene makes grim use of his skill in his special art. "I like my art," he says, "and I know how to exercise my art," and so on. More seriously, Dickens makes effective use of Lizzie Hexam's skill in rowing, "Merciful Heaven, be thanked for that old time," she prays, when saving Eugene, "and grant, O Blessed Lord, that through Thy wonderful workings it may turn to good at last,"—and again, "Heaven be thanked for that old time, enabling me, without a wasted moment, to have got the boat afloat again, and to row back against the stream." A similar use is made of Marguerite's

Let us follow this clue as far as it will lead. In other words, let us see what further connexion there may be between Jasper's proceedings and the key of the Sapsea monument.

On his way home from Mr. Sapsea's house, late the same night, Jasper comes across Durdles, "dinner bundle and all" (it will be remembered that the key is in this bundle) "leaning his back against the iron-railing of the burial-ground enclosing it from the old cloister arches, and a hideous small boy in rags flinging stones at him, as a well-defined mark in the moonlight." This boy, by the way, was, I think, to have played a very important part in the development of the plot. Here let it only be noted that Durdles

familiarity with the dangers of Swiss mountain travelling, in Dickens's part of "No Thoroughfare" (note also in passing how he employs in finished works ideas first used in his Christmas sketches). In his earliest story, Dickens had shown that he recognised the value of such points. For instance, in Sam Weller's election tale, we hear how old Weller is invited to use his special skill to change the course of the voting. "'You're a wery good whip, says the gen'l'm'n, and can do what you like with your horses, we know. We're all very fond of you, Mr. Weller, so in case you should have an accident when you're a bringing these here voters down, and *should* tip 'em over into the canal without hurting of 'em, this is for yourself, says he." Later Mr. Weller exercises his professional skill on his own account. "'I rather think, Samivel,'" he says, speaking of the Rev. Mr. Stiggins, "'that he found hisself a little jolted when we turned the corners.' 'Wot, I spose you happened to drive up agin a post or two?' said Sam. 'I'm afeerd,' replied Mr. Weller, in a rapture of winks, 'I'm afeerd I took vun or two on 'em, Sammy; he wos a flyin' out o' the harm-cheer all the way.'"

has "taken the boy in hand and given him an object," by the original plan of rewarding him with a half-penny to pelt Durdles home if the boy "ketches 'im out arter ten;" and as Durdles himself estimates the boy's earnings at "the three penn'orth a week," we infer that on every week-day Durdles does stay "out arter ten." This is the better worth noting in connexion with the Mystery of Edwin Drood, that Durdles habitually resorts to the cathedral crypt to sleep off the fumes of liquor.

Jasper crosses over to the railing where "the stony (and stoned) one is profoundly meditating," and offers to accompany Durdles home, adding, "Shall I carry your bundle?" "Not on any account," says Durdles, as to the bundle, explaining further that "Durdles was making his reflections, surrounded by his works like a popular author," and he points out the monuments, naming them, Sapsea's among the number. They walk towards Durdles' home, Jasper twice calling Durdles' attention to the boy following them at some distance. Jasper manifestly objects to the boy's attendance.

Presently Jasper asks Durdles about his reputed skill "in telling where people are buried." To explain his method, Durdles has to put down his bundle, and as he looks round for a ledge or corner on which to place it, Jasper says, "That bundle is in your way; let me hold it," and so takes it. "Just you give me my hammer out of that," says Durdles, "and I'll show you." Clink, clink, and his hammer is handed

him. Jasper has had another opportunity of taking the sound of the key. Dickens has so artfully brought in this touch, feels, perhaps, so secure against its being noticed, that he throws in words actually describing what Jasper had really done when he clink-clinked the key. Says Durdles, "Now look'ee here. You pitch your note, don't you, Mr. Jasper?" "Yes," replies Jasper. "So I sound for mine," proceeds Durdles, "I take my hammer and I tap." And he goes on to explain how by long practice he has learned to recognise from the sound whether a monument is empty, or has a stone coffin in it, and whether a coffin so detected has remains in, or these have crumbled away—points which, we may be sure, bear strongly on the future progress of the story, though not on the particular clue which I am at present following up.

We hear no more of the key until we reach the twelfth chapter, describing Jasper's midnight visit to the cathedral with Durdles. It is necessary to notice, by the way, that the moon rises late on the night of this visit—for the moon is so often referred to in the description as to show that importance is attached to the point. (It is yet again passingly referred to later, when Neville, in speaking to his sister about the walk he had taken with Crisparkle the same night, says, "We took a moonlight walk last Monday night." We may be sure this continual reference to the moonlight is not without significance.) The time, also, is specially noted in its relation to the night of the

murder. Jasper hides with Durdles behind a wall when Crisparkle and Neville pass, watching Neville, "as though his eye were at the trigger of a loaded rifle, and he had covered Neville, and were going to fire." He hears Crisparkle say to Neville, "This is the first day of the week, and the last day of the week is Christmas Eve." If the moon rose late, say at nine or ten, on Monday evening, then at the time of the murder, the night between Saturday and Sunday, there would be no moon, the moon not rising till about three on Sunday morning. The hour at which the moon rose on the Monday night is not actually mentioned. But we can readily infer it within an hour or so. We read that "the lamplighter now dotting the quiet close with specks of light, &c., the Dean withdraws to his dinner, Mrs. Tope to her tea, and Mr. Jasper to his piano," — say about six. "There, with no light but that of the fire, he sits chanting choir-music in a low and beautiful voice," (clear evidence that what is about to happen is closely connected with his murderous designs against Edwin, for he is always most musical when most murderously minded), "*for two or three hours, in short, until it has been for some time dark, and the moon is about to rise.*" "Then he closes his piano softly, softly changes his coat for a pea-jacket, with a goodly wicker-cased bottle in its largest pocket, and putting on a low-crowned, flap-brimmed hat, goes softly out. Why does he move so softly to-night? No outward reason is apparent for it. Can there be any sym-

pathetic reason crouching darkly within him?" All very significant of the nature of the expedition with which, as we shall see, the clinking of those keys is to be associated.

They set forth on the expedition, "surely an unaccountable sort of expedition," as Dickens notes again and again, with such iteration, indeed, as to show that if we can interpret the meaning of this expedition we shall have gone some way towards explaining the Mystery of Edwin Drood. By the yard gate they pass a mound of quicklime, about which Jasper is quick to ask, and of which Durdles says that it is "quick enough to eat your boots; with a little handy stirring, quick enough to eat your bones." They presently pass "the red windows of the Travellers' Twopenny and emerge into the clear moonlight of the Monks' Vineyard. This crossed, they come to Minor Canon Corner; of which the greater part lies in shadow, until the moon shall rise higher in the sky." They wait till Crisparkle and Neville, who came out here, are gone, "passing out into the moonlight at the opposite end of the Corner." Then they pass on, through secluded nooks where there is very little stir or movement after dark, little enough at the high tide of the day, but next to none at night. Besides that the cheerfully frequented High Street lies nearly parallel to the spot (the old cathedral rising between the two), and is the natural channel in which the Cloisterham traffic flows, a certain awful hush pervades the ancient pile, the

cloisters, and the churchyard, after dark, which not many people care to encounter. "Hence, when Mr. Jasper and Durdles pause to glance around them before descending into the crypt by a small side door, of which the latter has a key, the whole expanse of moonlight in their view is utterly deserted. One might fancy that the tide of life was stemmed by Mr. Jasper's own gatehouse. The murmur of the tide is heard beyond; but no wave passes the archway, over which his *lamp burns red behind the curtains, as if the building were a lighthouse*"—words to be very specially noticed.

They enter, lock themselves in, descend the rugged steps, and are down in the crypt. Here they walk up and down the long lanes of moonlight, Durdles discussing the "old uns," and drinking freely from Jasper's wicker bottle, from which Jasper himself takes only one mouthful, with which he rinses his mouth, and casts forth the riusing. This is to tell us that the wine has been drugged. It passes now into Durdles' keeping.

They go up the steps leading to the cathedral, Durdles pausing here awhile to make some remarks about an experience he had had the year before. This bears so significantly on the mystery, though relating to an event not directly connected with it, that we must pause a moment to consider his narrative, though thus delayed for a while on our course along the clue indicated by the clinking of the keys. "Do you think," asks Durdles, "there may be ghosts of other things,

though not of men and women?" Jasper (who takes such suggestions ill, be it noticed) asks with contempt, "'What things? Flower-beds and watering-pots? horses and harness?' 'No. Sounds.' 'What sounds?' 'Cries.' 'What cries do you mean? chairs to mend?' 'No. I mean screeches. Now, I'll tell you, Mr. Jasper. Wait a bit till I put the bottle right.' Here the cork is evidently taken out again and replaced again. 'There! *now* it's right! This time last year, only a few days later, I happened to be doing what was correct by the season, in the way of giving it the welcome it had a right to expect, when the town boys set on me at their worst. At length I gave 'em the slip, and turned in here. And here I fell asleep. And what woke me? The ghost of a cry. The ghost of one terrible shriek, which shriek was followed by the ghost of the howl of a dog; a long, dismal, woful howl, such as a dog gives when a person's dead. That was *my* last Christmas Eve.' 'What do you mean?' is the very abrupt, and, one might say, fierce retort. 'I mean that I made inquiries everywhere about, and that no living ears but mine heard either that cry or that howl. So, I say, they was both ghosts, though why they came to me I've never made out.' 'I thought you were another kind of man,' says Jasper, scornfully. 'So I thought myself,' answers Durdles, with his usual composure 'and yet I was picked out for it.' Jasper had risen suddenly when he asked him what he meant, and he now says, 'Come, we shall freeze here; lead the

way.'" This story, and its curious effect upon Jasper, should be specially noted.

Jasper, as they go on, begins a close scrutiny of Durdles' appearance and demeanour, which is from this point often and pointedly referred to. He wishes to learn in what way the drugged wine operates,—not solely that he may act accordingly towards Durdles himself. It is clear the experiment is to be tried on another person. To understand Dickens' use of this conception, that, namely, of a person testing beforehand the effects of a drug, the reader should study "No Thoroughfare," where the drugging of George Vendale by Obenreizer belongs to the portion of the story which was written by Dickens; though when that story first appeared many attributed this portion to Wilkie Collins—remembering possibly how the latter had followed a somewhat similar course in "The Moonstone."

Durdles "bears the close scrutiny of his companion in an insensible way, though it is prolonged while the latter fumbles among his pockets for a *key* confided to him that will open an iron gate, so as to enable them to pass to the staircase of the great tower. '*That* and the bottle are enough for you to carry,' he says, giving it to Durdles; 'hand your bundle to me; I am younger and longer-winded than you.' Durdles hesitates for a moment between bundle and bottle; but gives the preference to the bottle, as being by far the better company, and consigns the dry weight to his fellow-explorer." Then they climb up the winding

staircase of the great tower. . . . . "At last, leaving their light behind a stair—for it blows fresh up here —they look down on Cloisterham, fair to see in the moonlight; its ruined habitations and sanctuaries of the dead at the tower's base; its moss-softened, red-tiled roofs and red-brick houses of the living clustered beyond; its river winding down from the mist on the horizon, as though that were its source, and already heaving with a restless knowledge of its approach towards the sea." Then to emphasise this particular part of the narrative, comes in the refrain—"Once again, an unaccountable expedition this!" "Jasper (always moving softly with no visible reason) contemplates the scene, and especially that stillest part of it which the cathedral overshadows." As they descend Durdles becomes more and more drowsy. And, at last, when they have descended into the crypt again, "with the intent of issuing forth as they entered," Durdles half drops, half throws himself down, by one of the heavy pillars, and indistinctly appeals to his companion for forty winks of a second each. Consent given, Durdles is asleep at once; and in his sleep he dreams a dream.

His dream tells us all we are to learn at this stage about the use to which Jasper puts his test of the sounds emitted by the keys. "It is not much of a dream, considering the vast domains of dreamland and their wonderful productions. It is only remarkable for being unusually restless and unusually real. He dreams that the footsteps die away into distance of

time and of space, and that something touches him, and that something falls from his hand. Then something clinks and gropes about; and he dreams that he is alone for so long a time that the lanes of light take new directions as the moon advances in her course. From succeeding unconsciousness he passes into a dream of slow uneasiness from cold; and painfully awakes to a perception of the lanes of light, really changed much as he had dreamed, and Jasper walking among them, beating his hands and feet. 'Halloa!' Durdles cries out, unmeaningly alarmed. 'Awake at last?' says Jasper, coming up to him. 'Do you know that your forties have stretched into thousands?' 'No.' 'They have, though.' 'What's the time?' 'Hark! the bells are going in the tower!' They strike four quarters, and then the great bell strikes. 'Two!' cries Durdles, scrambling up; 'why didn't you try to wake me, Mister Jasper?' 'I did. I might as well have tried to wake the dead—your own family of dead, up in the corner there.' 'Did you touch me?' 'Touch you? Yes. Shook you.' As Durdles recalls that touching something in his dream, he looks down on the pavement and sees the key of the crypt door lying close to where he himself lay. 'I dropped you, did I?' he says, picking it up, and recalling part of his dream. As he gathers himself up again into an upright position, or into a position as nearly upright as he ever maintains, he is again conscious of being watched by his companion. 'Well,' says Jasper, smiling, 'are you quite ready?

Pray, don't hurry.' 'Let me get my bundle right, Mister Jasper, and I'm with you.' *As he ties it afresh, he is once more conscious that he is very narrowly observed.*"

What has happened while Durdles slept? To say that all that has happened is clear, would be to say that Dickens had failed in his obvious purpose of keeping the true secret of the Mystery of Edwin Drood undisclosed at this point, and till towards the close of the story. But certain points may be noted as fairly clear. First, Durdles' dream has corresponded with Jasper's movements, just as the motion of the lanes of light in his dream has corresponded with their real motion. Next, Jasper has taken from the sleeping stonemason the key of the crypt, has sounded the keys in the bundle; has assured himself which is the key he wants (the key of the Sapsea monument), and has gone out of the crypt, the door of which, we had been expressly told, they had locked after entering. How Jasper had employed the long time passed outside the crypt (we remember how long Durdles was alone) is not so clear. He had time to take the all-important key to his own room, and the solitude of the midnight hours would have allowed him to do so unobserved. He had time to have opened the monument and to remove to it a quantity of the quicklime near the yard gate. What he is supposed actually to have done in the interval would have been told in the sequel. What suffices for my purpose here, is to note that the time had been employed in furthering

his murderous scheme, and that the key whose tone he had taken at Sapsea's was used by him in so doing. This last is shown by the whole course of the narrative. The former point, which, of course, is made equally clear, is further shown by what follows.

Jasper has got all he wants from Durdles, and is leaving him to "make his own way home," when "a sharp whistle rends the silence," and the jargon is yelped out:—

> Widdy widdy wen!
> I ket—ches—Im—out—ar—ter—ten,
> Widdy widdy wy!
> Then E—don't—go—then—I—shy—
> Widdy widdy wake-cock warning!

Instantly afterwards a rapid fire of stones rattles at the cathedral wall, and the hideous small boy—the baby-devil as Jasper calls him—is seen opposite, dancing in the moonlight. Jasper is roused to fury so violent that he seems an older devil himself. The cause of his fierce wrath is soon seen. "'Don't hurt the boy, Mister Jarsper,' urges Durdles, shielding him. 'Recollect yourself.' 'He followed us to-night,' says Jasper, 'when we first came here!' 'Yer lie, I didn't!' replies Deputy (the boy), in his one form of polite contradiction. 'He has been prowling near us ever since!' 'Yer lie, I haven't,' returns Deputy. 'I'd only jist come out for my 'elth when I see you two a coming out of the kinfreederel. If

> I ket—ches—Im—out—ar—ter—ten!'

(with the usual rhythm and dance, though dodging

behind Durdles) 'it ain't *my* fault, *is it?*' 'Take him home, then,' retorts Jasper, ferociously, though with a strong check upon himself, 'and let my eyes be rid of the sight of you!' Deputy, with another sharp whistle, at once expressing his relief and his commencement of a milder stoning of Mr. Durdles, begins stoning that respectable gentleman home as if he were a reluctant ox. Mr. Jasper goes to his gatehouse, brooding. And thus, as everything comes to an end, the unaccountable expedition comes to an end—for the time."

I have dwelt more upon this preliminary expedition than I propose to do upon the circumstances which are described as occurring on the night of the attack on Edwin Drood, because I believe they are more significant than these last. In like manner I propose to dwell at length only on one set of circumstances belonging to the narrative of events following the disappearance of Edwin Drood.

In the interval between Monday, December 19, and Saturday, December 24, the betrothed pair part. Edwin does not even show Rosa the ring which Mr. Grewgious had entrusted to him for her, if their betrothal prospered and came to maturity. Let the jewels be, he says to himself. Let them lie unspoken of in my breast. However distinctly or indistinctly he entertained these thoughts, he arrived at the conclusion, Let them be. "Among the mighty store of wonderful chains that are for ever forging, day and night, in the vast iron-works of time and circumstance,

there was one chain forged in the moment of that small conclusion, riveted to the foundations of heaven and earth, and gifted with invincible force to hold and drag." From the stress laid upon this point, and the clear words in which its association with the mystery is spoken of, we may safely infer, I think, that it is intended partly to mislead the reader. It would have appeared in the sequel that this ring of diamonds and rubies was, indeed, to have proved of force invincible to hold and drag; but not in the way which the reader supposes. He would connect the ring, naturally, with what is said later on about Jasper's having "an inventory in his mind of all the jewellery his gentleman relative ever wore, namely, his watch and chain, and his shirt-pin." He would probably connect it also with the mound of quicklime to which Jasper's attention had been called during the night expedition by Durdles. He would conclude that Jasper had determined to remove all jewellery from the clothes of his victim, that nothing might be left which the quicklime would not destroy. And so far he would conclude rightly. But the natural inference that Jasper having on the night of the attack carried out this purpose, the ring of jewels concealed in Drood's breast remained, and was eventually found amongst the quicklime and *so* led to Jasper's conviction, would, I think, have proved altogether erroneous. It will presently be seen why (apart from the stress laid by Dickens on this ring of jewels, always a suspicious circumstance when he is par-

posing to keep a mystery concealed) I entertain this opinion.

Neville, Drood, and Jasper meet in Jasper's rooms on Christmas Eve. We learn nothing about the meeting, but we infer that it passes off in a friendly way so far as the two former are concerned. At midnight (we learn afterwards) these two go down to the river together, doubtless at Jasper's suggestion, to watch the effects of the fierce storm which has begun to rage that evening over Cloisterham. We learn nothing further of Drood's doings that night. But it is made clear to us that Neville and Drood separate, the latter returning to Jasper, and being no more seen. Jasper, as on the night of the "unaccountable expedition," has been singularly calm and quiet. In the choir's pathetic supplication to have his heart inclined to keep this law, he quite astonishes his fellow-singers "by his melodious power." . . . . "The mere mechanism of his throat is a little tender, for he wears, both with his singing-robe and with his ordinary dress, a large black scarf of strong close-woven silk, slung loosely round his neck." But the scarf is for another purpose. "Later, when arriving under the arched entrance of his dwelling, he pauses for an instant in the shelter and pulls off that great black scarf, hanging it in a loop upon his arm; and for that brief space his face is knitted and stern."

All that night the red light burns steadily "in the lighthouse on the margin of the tide of busy life." In other words, Jasper is supposed by those who pass

along the tide to be in his room in the gatehouse, engaged in quiet study; for it is the lamp behind his curtain, which is as a lighthouse over the archway beyond which pass at night no waves of busy life. "It comes on to blow a boisterous gale. The precincts are never particularly well lighted; but the strong blasts of wind blowing out many of the lamps, they are unusually dark to-night. The darkness is augmented and confused by flying dust from the earth, dry twigs from the trees, and great ragged fragments from the rooks' nests up in the tower. The trees themselves so toss and creak, that they seem in peril of being torn out of the earth; while ever and again a crack and a rushing fall denote that some large branch has yielded to the storm." A night on which the fall of a ton's weight from the great tower of the cathedral might well pass unnoticed. "No such power of wind has blown for many a wintry night. Chimneys topple in the street, and people hold to posts and corners, and to one another, to keep themselves upon their feet." . . . "Still the red light burns steadily. Nothing is steady but the red light." . . . "All through the night the wind blows, and abates not. But early in the morning, when there is barely enough light in the east to dim the stars, it begins to lull. From that time, with occasional wild charges like a wounded monster dying, it drops and sinks; and at full daylight it is dead." It is then seen that the hands of the cathedral clock are torn off; that lead from the roof has been stripped off, rolled away, and blown

into the Close; and that *some stones have been displaced upon the summit of the great tower.* It is as the workmen, led by Durdles, are going aloft to ascertain the extent of the damage, that Jasper breaks in upon the crowd gathered to watch for the appearance of the workmen on the tower, with the cry, "Where is my nephew?" Edwin Drood has disappeared in the night.

Precisely what happened on that stormy night it would be vain to guess. In many ways the event which the author seems to suggest—the actual murder of Drood by Jasper, the closing up of his body within the Sapsea monument, to be followed by the destruction of all trace of him except the ring of jewels—might have been brought about; in more ways than one, also, Jasper's plot might have failed, while yet he deemed it to have succeeded. About the details of that night's occurrences it must be as idle to guess as about the precise events which happened during the sleep of Durdles on the night of the preceding Sunday. The interest of the story would have been lost if such details could have been definitely ascertained at this stage of the narrative. But it does not follow that we cannot guess how the mystery, speaking generally, was to have been explained, though we may not guess what were to be the actual details of the explanation.

Let us consider how the matter stands.

In the first place, it is clear that Dickens has intended to convey the impression that Edwin Drood

is murdered, his body and clothes consumed, Jasper having first taken his watch and chain and shirt-pin, which cannot have been thrown into the river till the night of Christmas Day, since the watch, wound up at twenty minutes past two on Christmas Eve, had run down when found in the river. Possibly more was to have depended on this point, by the way; for Jasper would suppose that the watch had been wound up late on the 23rd. Be this as it may, the clearness with which we seem to recognise that the murder has been successfully accomplished, the words "poor youth! poor youth!" when Edwin is taking his last look "at the old landmarks," and again, "He called her Pussy no more: never again," and so forth, only make it more probable that what seems thus clearly suggested is not what has actually happened.

Let me digress for a moment to consider a parallel case. There are many features in which "No Thoroughfare" resembles the "Mystery of Edwin Drood." Obenreizer reminds us of Jasper; George Vendale, in his utter absence of suspicion, as also in some points of character, resembles Edwin Drood. Now nothing can be clearer than the suggestions in the earlier part of "No Thoroughfare" that Vendale is to be murdered, or than the apparent evidence in the third act (entirely by Dickens, be it remembered) that Vendale has been murdered. If Dickens did not write the whole of the scene in which a clot of the gloomy ragged growth of dark fungus, in colour like blood, falls on Vendale's breast, just after Joey Ladle

has said that "the man that gets by accident a piece of that dark growth right in his breast will for sure and certain die by murder," style counts for nothing; since there is not a line in the passage which is not as like Dickens' style as it is utterly unlike Wilkie Collins'. The scene of the attack on Vendale by Obenreizer, and the recovery of the body by Marguerite is known to be by Dickens. If ever a man was killed passed all seeming hope, by a novelist, George Vendale was killed in Act III. of "No Thoroughfare." "His heart no longer beats against mine," says Marguerite, towards the close; and the last words of the chapter tell us that "she sank over him on his litter, with both her loving hands upon the heart that stood still." But he comes to life again in Act IV., as we have felt all along that he will, despite what seems the clearest evidence to the contrary—simply because George Vendale is not the sort of character whom Dickens ever kills. Nellie and Paul, Richard Carson and Neville Landless, all the characters who die in Dickens's stories, are marked for death from the beginning. George Vendale is not marked for death, and he does not die; though everything is done to suggest the idea first that he is to be killed, and afterwards that he has been killed by Obenreizer. Edwin Drood belongs to the same class of characters. There is not one note of death in aught that he does or says. As the time approaches for Jasper's attack on him, there is much in the music of the story to suggest that trouble is approaching;

but he is not to die, albeit the reader is to think him dead. The music of his words was under Dickens' control in the same sense that the timbre of his natural voice was under his control. He might disguise it more or less successfully, according to the quality of his hearer's audition; he could not really change it. So he does all he can to conceal by his words the ideas which, nevertheless, the sound of his voice suggests most clearly to those who have ears to hear.

I take it that Drood, though not killed, is desperately injured, and that he remains unconscious of most that happened, knowing only that Jasper had suddenly turned in deadly assault upon him. I think it would have appeared that Durdles and the stone-throwing boy save Drood from death. It would have been in Dickens' manner, and would also have accorded well with his own personal ideas about presentiments—(note his story of the "Signalman")—if the ghost-sound heard by Durdles on the Christmas Eve of the preceding year, at about the hour when Drood is supposed to have been murdered, should have turned out to be a forewarning of Jasper's attack on Drood. Durdles, "doing what was correct by the season," and driven by stress of stony warnings to take refuge in the crypt, hears this time, not the ghost of a terrible shriek, but the reality; takes it, perhaps, for another ghostly warning; but later (roused by the stone-throwing Deputy), is moved to search about, and exercising the peculiar skill which enabled him to

find the crumbling remains of "old uns," in unopened monuments, detects the presence of a body in the Sapsea monument, and rescues Drood from thence while life still remains in him.

Does Grewgious know of Jasper's attack on Drood, and therefore (for in no other way could he know of it) has he had communication in some way with Drood himself? Let us consider the facts.

On the evening of December 27, Mr. Grewgious calls on Jasper, just returned from the second day's search in the river, "unkempt and disordered, bedaubed with mud that had dried upon him, and with much of his clothing torn to rags." An object surely of pity to one who knew of him only as the loving uncle of the missing man. Does Grewgious pity him? He says only, "This is strange news." "Strange *and fearful* news," says Jasper. Mr. Grewgious speaks then so curtly and coolly that at any other time Jasper would have been exasperated (we are expressly told); but now he is too exhausted and depressed to retort angrily. Then he makes a communication to Jasper which literally floors the poor wretch. Yet even when he sees the ghastly figure, every action of which he watched, fall, "a heap of torn and miry clothes upon the floor," Mr. Grewgious shows no pity. "Not changing his action even then, he opened and shut the palms of his hands as he warmed them, and looked down at it." If Mr. Grewgious does not know for certain that Jasper and no other has sought Drood's life, all this scene is

utterly untrue to nature, for Grewgious is not a hard man, though angular. If he does know this for certain, he knows it certainly from no other than Drood himself.

But, unless I mistake, Drood himself reappears in the story.

About half a year after the disappearance of Drood, a stranger comes to Cloisterham, a white-haired personage with black eyebrows. Being buttoned up in the tightest blue surtout, with a buff waistcoat and grey trousers, he had something of a military air, but he announced himself as an idle dog living on his means.

It is plain, to begin with, that Datchery has taken up his abode in Cloisterham to watch Jasper. Dickens is rather careful to suggest that whoever Datchery may be, he cannot be Drood. For he describes him as losing his way when going to Mrs. Tope's place (which Edwin Drood knew well, of course) from the Crozier. But we are expressly told that the Crozier was an hotel of most retiring disposition, so that even a resident in Cloisterham, which Drood had not been, might lose his way if he started from this hotel. Apart from this we not only know that Dickens would have carefully tried to mislead the reader in so critical a matter for the interest of his story, but that he had expressed anxiety to Miss Hogarth about this very point. "He feared," says Forster, "that he might have plunged too soon into the incidents leading to the catastrophe, such as the Datchery assumption in the fifth number." (Note in passing

that the book was to have been completed in twelve numbers, not in twenty-four,—and that one-half the story was written.) The Datchery *assumption*, be it remarked. Had Dickens unconsciously used, in speaking to Miss Hogarth, a word implying that Datchery is one of the old characters of the book under disguise? and had she and Forster, each without noting the significance of the word "assumption," repeated it? It was surely not the word a practised writer like Forster would naturally have used. If Datchery were Drood, or Grewgious, or any other of the known characters of the book, one would speak of the Datchery assumption as a convenient way of expressing that the character of Dick Datchery, "an easy-going single buffer living on his means," had been thus assumed; but otherwise the word would be quite incorrect.

Forster repeats what Dickens told him about his intention, that being precisely what seems to be suggested in the story itself, and therefore precisely what I conceive Dickens did not really intend, so far as the true "mystery" was concerned. All the rest he did intend. We perceive clearly enough what Dickens clearly wishes to be correctly perceived, that "Rosa is to marry Tartar, and Crisparkle the sister of Landless, who is himself to sacrifice his life in unmasking and seizing the murderer." We see that a noble friendship is to spring up between Neville and Tartar, and so forth. But if "Jasper murders Drood and is eventually convicted by means of the gold ring which had resisted the

corrosive effects of the lime into which he had thrown the body," then the mystery is transparent from the beginning. But Forster himself says that Dickens had described his idea for the story as "a very new and curious one," and as "not a communicable idea (or the interest of the book would be gone), but a very strong one, though difficult to work." "Immediately afterwards," Forster adds, he learned all about this incommunicable idea, which, as described by him, should not have been difficult at all to work. I venture to assert that when Dickens said his idea was not communicable, he had not the least idea of communicating it immediately afterwards. In passing, I would call special attention to the way in which, in his short story "Hunted Down," Dickens uses the idea of a man supposed by a murderer to have been an unsuspecting victim, "starting suddenly into a determined man, with a settled resolution to hunt him down and be the death of him." The whole account of the Beckwith "assumption" in "Hunted Down" should be carefully studied in connection with the "Mystery of Edwin Drood." The idea was obviously a favourite one with Dickens, and he had not worked the vein out in "Hunted Down."

To return to Datchery.

In the first place, he is certainly disguised. That shock head of white hair, which made him constantly forget that he had no hat on, was of course a wig; and not only so, it was a wig worn (as Dickens in private theatricals had doubtless often himself worn a

wig) over the natural hair. That was why "the gentleman's white head was unusually large, and his shock of white hair unusually thick and ample," the latter to prevent all trace of the real hair being seen. Note also the "odd momentary appearance upon him of having forgotten his hat when Mr. Sapsea touched it" —"he clapped his hand to his head as if with some vague expectation of finding another hat upon it."

In the second place, Mr. Datchery not only knows Jasper to be guilty, but has a strong personal feeling against him. Now Datchery is certainly not Grewgious, nor any other known character in the story. No one at all familiar with Dickens' manner would for a moment imagine that Datchery is Bazzard, Mr. Grewgious's clerk. Bazzard was as certainly intended to come to grief and be exposed in the sequel, as was Silas Wegg in "Our Mutual Friend." Datchery was just as certainly to be triumphant as Harmon in his "Rokesmith assumption." Every one of the *dramatis personæ*, except Drood himself, can be shown to be for one reason or another out of the question. Who, then, can this be who must disguise himself in Cloisterham, yet knows the whole story of the murder? The care with which it is explained that he has as confused a knowledge of the event in question, on trying to recall it, as he well could have, can deceive no one. Every line in the passage itself where this is stated implies that Mr. Datchery had singularly good reason for "knowing something," as Mrs. Tope puts it, "of what had occurred there last winter." He

establishes himself in rooms commanding the entrance to Jasper's. He visits Jasper the same afternoon, trusting confidently, as he well may, in escaping undetected. He visits with Sapsea, still on the same afternoon, the Sapsea monument. He makes an appointment with Durdles, and another with the Deputy. All an easy task enough, even for a single afternoon, if Datchery really were a stranger; but a hard enough task for Drood, who must throughout disguise voice and manner as carefully as his appearance is disguised. Now that evening he says to himself, "For a single buffer, of an easy temper, living idly on his means, I have had a rather busy afternoon."

But later (in a later number, remember), we have clearer evidence still. The evening before his disappearance, Drood had a remarkable interview with the old opium-eating woman—an interview of which no one but those two themselves could have had any knowledge. For, immediately after the interview, Drood makes for Jasper's room, resolving as he walks on to say nothing of the interview "to-night, but to mention it to Jack" (Jasper), "as an odd coincidence, to-morrow." Now in the last page of the last chapter written by Dickens, the old opium-eater, in her pursuit of Jasper, encounters Datchery, sitting on guard, "a large-headed grey-haired gentleman" (with dark eyebrows), "under the odd circumstances of sitting open to the thoroughfare, and eyeing all who pass, as if he were toll-taker of the gateway."

"'Halloa,' he cries in a low voice, seeing her brought to a standstill." That cry, in a low voice, means surely that he has seen her before. She asks for information about Jasper; and the burst of triumph in which she thanks him does not escape Datchery's notice. He lounges along beside her, and tells her that instead of going as he had suggested to the cathedral next morning to see Jasper, she can go up at once to his rooms. With a cunning smile she shakes her head. "His *purposeless* hands" rattle the loose money in the pockets of his trousers; and, almost as though the movement had *had* a purpose and that was it, her greedy ears are attracted by the chink. She begs for money to pay for her travellers' lodging. "'You know the travellers' lodging, I perceive, and are making directly for it,' is Mr. Datchery's bland comment, still rattling his loose money. 'Been here often, my good woman?' 'Once in all my life.' 'Ay, ay.'" They have reached the very spot where Edwin Drood had given her money on Christmas Eve, and the place reminds her of the gift. "'A young gentleman gave me three-and-sixpence as I was coughing my breath away on this very grass. I asked him for three-and-sixpence, and he gave it me.' 'Wasn't it a little cool to name your sum?' hints Mr. Datchery, still rattling. 'Isn't it customary to leave the amount open?' Mightn't it have had the appearance to the young gentleman—only the appearance—that he was rather dictated to?'" Can one not feel, let me ask in passing, that it is "the

young gentleman" himself who is speaking to her?

As if she felt in some instinctive way that she had the same free-handed person before her, "'Look'ee here, deary,' she says, in a confidential, persuasive tone, 'I wanted the money to lay it out on a medicine as does me good, and as I deal in. I told the young gentleman so, and he gave it me, and I laid it out honest to the last brass farden. I want to lay out the same sum in the same way now; and if you'll give it me, I'll lay it out honest to the last brass farden again, upon my soul!' 'What's the medicine?' 'I'll be honest with you beforehand, as well as after. It's opium.' Mr. Datchery, with a sudden change of countenance, gives her a sudden look." Is it that he begins to see his way to learning what he wants to know about Jasper? what he has set himself to find?

"Mr. Datchery begins very slowly to count out the sum demanded of him. Greedily watching his hands, she continues to hold forth on the great example set him. 'It was last Christmas Eve, just arter dark, the once that I was here afore, when the young gentleman gave me the three-and-six.' Mr. Datchery stops in his counting, finds that he has counted wrong, shakes his money together, and begins again." Is he disturbed because she has mentioned the day on which he was attacked by Jasper? "'And the young gentleman's name,' she adds, 'was Edwin.'" Mr. Datchery drops some money, stoops to pick it up, and reddens

with the exertion as he asks: "'How do you know the young gentleman's name?' 'I asked him for it, and he told it me. I only asked him two questions, what was his Chris'en name, and whether he'd a sweetheart? And he answered Edwin, and he hadn't.'"

He had been confused when she referred to Christmas Eve, startled when she spoke of the name by which (if my idea is correct) he had been known among men. Now when she mentions his lost sweetheart, "Mr. Datchery pauses with the selected coins in his hand, rather as if he were falling into a brown study of their value, and could not bear to part with them." Nay, but he was thinking of the value of her he had lost, and could not bear to part with the thought of her. He bestows the money on the old woman "as if he were abstracting his mind from the sacrifice,"—his real thoughts being on Rosa and the sacrifice he had still to make for her. Mark what now follows. "John Jasper's lamp is kindled, and his lighthouse is shining, when Mr. Datchery returns alone towards it. *As mariners on a dangerous voyage, approaching an iron-bound coast, may look on the beams of the warning light to the haven lying beyond it that may never be reached, so Mr. Datchery's wistful gaze is directed to this beacon, and beyond.*" Beyond, to Rosa's love, when he shall have unmasked the villany of Jasper (the task he has set himself, the iron-bound coast he is approaching), love that he can never win, because it has been won already by another.

One other point remains to be mentioned, among those few striking features which seem to me to indicate how the story was to have ended as regards the mystery of Drood's disappearance. If Datchery is not Drood, the work done in the afternoon when he met the old woman should have notably advanced his purpose, for he had learned a good deal that was new. On the other hand, if he is Drood he has learned little. Let us see what he himself has to say on this point. After his supper that evening he rises, throws open the door of a corner cupboard, and refers to a few uncouth chalked strokes on its inner side. "'I like,' says he, 'the old tavern way of keeping scores. Illegible except to the scorer. The scorer not committed, the scored debited with what is against him. Hum! ha! A very small score this, a very poor score!'" This refers to the score already made, be it noticed. "He sighs over the contemplation of its poverty, takes a bit of chalk from one of the cupboard shelves, and pauses with it in his hand, uncertain what addition to make to the amount. 'I think a moderate stroke,' he concludes, 'is all I am justified in scoring up;' so, suiting the action to the word, closes the cupboard and goes to bed." We have reached the last page that Dickens wrote, but we have not yet quite done with Mr. Datchery's scoring. He attends morning service at the cathedral, and there sees the old opium-eater. He sees her shake her fist at Jasper behind a pillar's friendly shelter. He looks again to convince himself. Yes,

again!" "As ugly and withered as one of the fantastic carvings on the under brackets of the stall seats, as malignant as the Evil One, she hugs herself in her lean arms, and then shakes both fists at the leader of the choir." He speaks to her after the service. He asks if she knows Jasper. "'Know him! Better far than all the reverend parsons put together know him.' Mrs. Tope's care has spread a very neat, clean breakfast ready for her lodger. Before sitting down to it he opens his corner cupboard door, takes his bit of chalk from its shelf, *adds one thick line to the score, extending from the top of the cupboard down to the bottom, and then falls to with an appetite.*" What he had learned the day before had seemed worth little compared with what he had learned this morning. To any one but Edwin Drood the morning's performance would have had little significance compared with the discovery made in the preceding afternoon. To Drood the afternoon's events would have brought scarcely any information, while the recognition of the old woman's wrath against Jasper, and of her knowledge of his true character, would have been full of promise. The scores made upon the cupboard door show plainly how the events of the two days were really valued, and mark Dick Datchery plainly as no other than Edwin Drood himself.

How the story was to have ended—in its general features though not in details—is plainly enough shown. The old woman has discovered a way of doctoring Jasper's opium so that he can be made to

describe his visions of the attack on Drood—his "journey as it was really made." She was gradually to have learned and told Datchery all that Jasper would have wished to conceal. Jasper, guiltless in reality though not in intention of Drood's death, was to have been brought to his end by the death of Neville Landless—much as Jonas Chuzzlewit, innocent in reality of the death of old Anthony Chuzzlewit, is brought to his end through the murder of Montague. Doubtless, though it may have been meant Jasper should, in the condemned cell, review his own career, writing out (as Dickens explained his purpose to Forster) the details of his temptations and his wickedness, the death of Jasper was to have been self-inflicted, the instrument being poison.

In conclusion, I would venture to express my strong dissent from the opinion which I have heard expressed by one of the ablest living novelists, that the "Mystery of Edwin Drood" was far below what Dickens had before written. It seems to me, on the contrary, far above the average of his other writings, and if inferior to any, inferior only to one or at the most two of his leading works. Even in its present fragmentary form, it is better worth close and careful study, and presents more truthful and delicate delineations of character and descriptions of scenery, than several finished works of his which yet have deservedly ranked as favourites.

Reading over again, after several months the story

which I have thus endeavoured to interpret, I have been struck by the clearness with which the plan and purpose of the narrative can be recognised. Points which I had before overlooked confirm strongly the interpretation which has been given above.

Thus, consider Datchery's start of surprise when the old opium-woman mentions his name. How well this is explained when we consider his position. He is seeking for evidence by which utterly to confound Jasper. Until this moment he has had no reason to connect the old woman with Jasper's schemes; but now he recalls her warning about "Ned." Just before, she had referred to opium, and Datchery had given her "a sudden look;" compare this with what had happened at the interview between her and Edwin at the same place before; she had then shown the strange aspect caused by opium-smoking, and, we read that Edwin, recoiling a step, looked at her in dread amazement, for he seemed to know her. "Good Heaven," he thinks next moment, "like Jack that night!" *Now*, he recalls all this, the dawning of an explanation at once suggests itself, which is only fully confirmed and connected with his plans against Jasper when next morning he sees from her gestures, and learns from her words, that she knows of Jasper's evil deeds.

I believe no one of discernment can read the account of the two interviews without perceiving unmistakably that the same person is speaking with the old woman in both; and when we once recognise the identity of

Edwin and Datchery, the mystery of Edwin Drood is explained, as Dickens himself saw clearly (see pp. 331, 332).

As to the end which the story was to have had, there can, I think, be very little doubt. There are certain characters marked out for quaint discomfiture; amongst these are unquestionably Sapsea, the jackass; the humbug Honeythunder, the selfish and stupid Bazzard, The Billickin, and in less degree the Dean and others, who have taken part against Neville Landless. Among the characters as plainly marked out for more or less quaint success are Grewgious (the Boffin of this story), Crisparkle, Tartar, Mrs. Twinkleton, Lobley, Durdles, Winks, and the old opium-eater. Jasper, watched all the time by Edwin, was to pursue his schemes against Landless; and I think that at the scene of Jasper's discomfiture Neville was to save Edwin's life from sudden attack at the cost of his own, living only long enough to know that he would be righted in all men's minds. (The pictures by Fildes on the paper covers of the original monthly numbers tell of a terrible surprise for Jasper at the tomb itself in which he supposed his victim to be.) Then Jasper, in prison, was to complete the account of his evil-doings, already told in all the leading details to the old opium-eater, Rosa was to give her hand to Tartar, Helena Landless to Crisparkle, while Edwin and Mr. Grewgious were to look on approvingly, though Edwin a little sadly, sharing thereafter the gentle regrets of Grewgious.

Read with these anticipations of the intended ending, "The Mystery of Edwin Drood" will be found a charming story, every line of which can be thoroughly enjoyed. The loss of the other half of the story, as Dickens would have told it, is irreparable; but it need not prevent the lovers of Dickens' works from losing the half he *has* told.

THE END.

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